

# The Mining Journal,

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An Illustrated Record of Mining, Metallurgical, Railway, Financial, Industrial, And Engineering Progress.

[The MINING JOURNAL is Registered at the General Post Office as a Newspaper and for Transmission Abroad.]

No. 3163.—VOL. LXVI.

LONDON, SATURDAY, APRIL 4, 1896.

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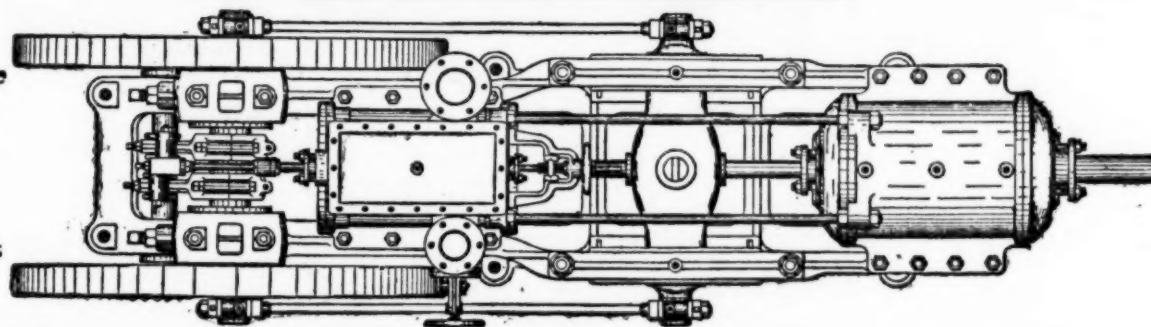


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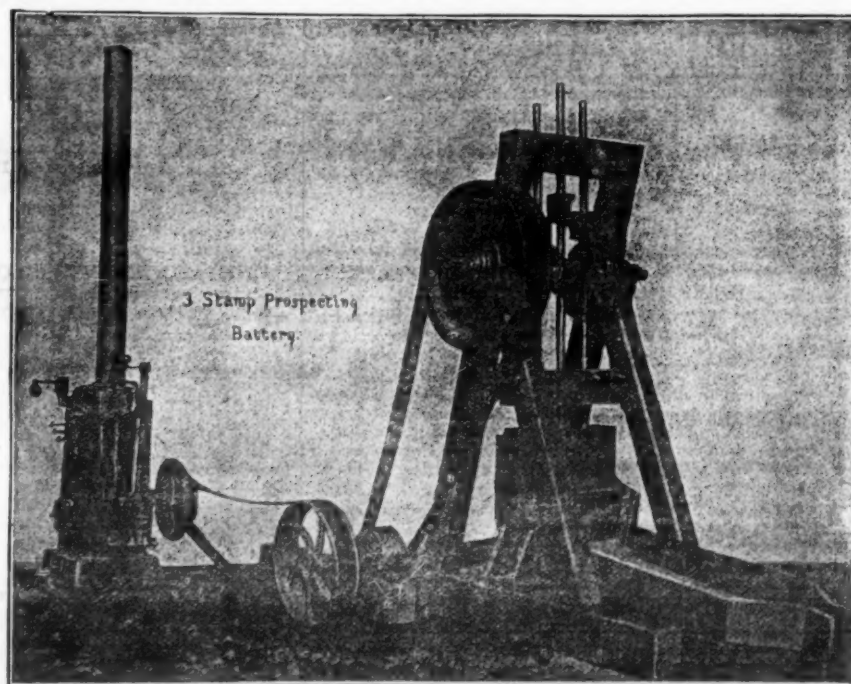
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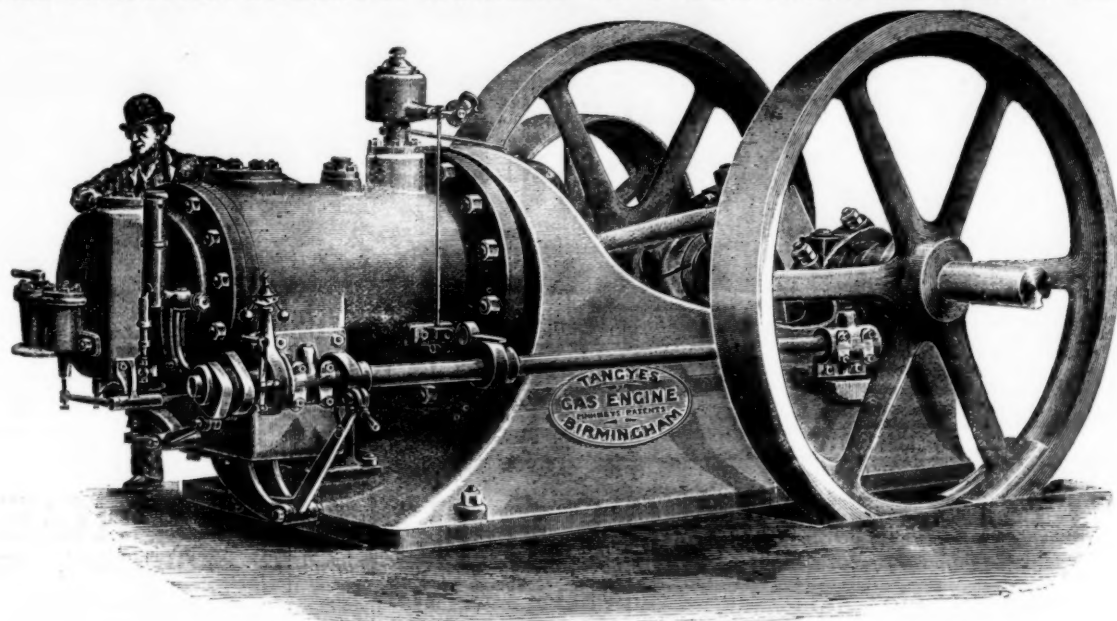
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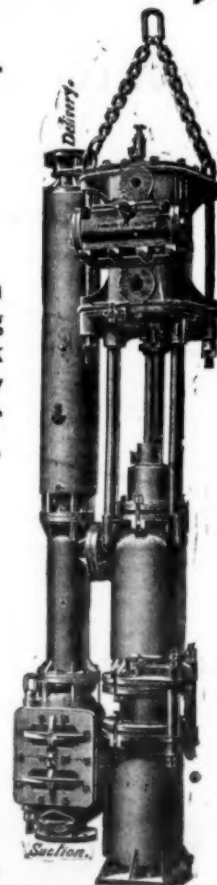
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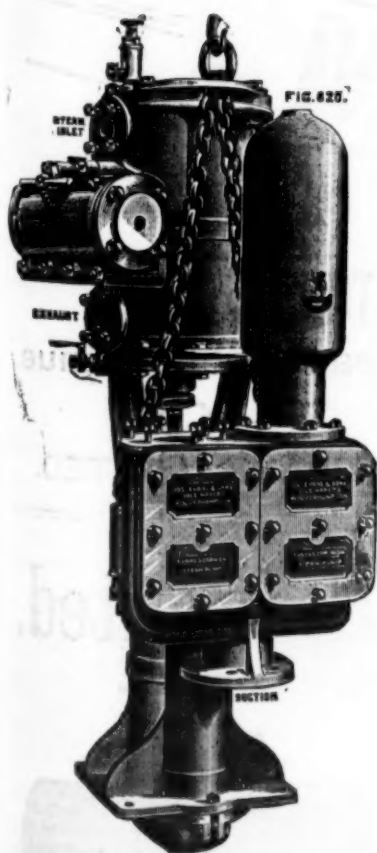


FIG. 875, "FLUOMETER"  
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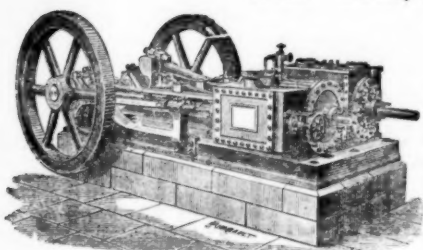
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## GEORGE GREEN, FOUNDRY, ABERYSTWYTH.

SILVER MEDALS AWARDED AT THE ROYAL CORNWALL POLYTECHNIC, 1872 & 1876; GOLD MEDAL AWARDED AT THE GREAT INTERNATIONAL MINING EXHIBITION, CRYSTAL PALACE, 1880.

ONLY AWARDS GIVEN FOR CONCENTRATION PLANTS.

### GREEN'S LATEST IMPROVED Self-Acting or Automatic Ore Dressing Machinery.

A Special Plant, on a reduced scale, has been erected at the Works by which samples of METALLIC ORES up to Five Tons may be treated, and the commercial value determined. In this way the most suitable arrangement of Plant is ascertained, a considerable advantage to intending Purchasers of Crushing and Concentrating Plant.

**GOLD STAMP AND OTHER MILLS.**  
 Estimates, Catalogues, and Full Particulars on Application.

Telegrams—Green, Foundry, Aberystwyth.

## For PURE ALUMINIUM

98 to 99½ per cent. (98 per cent. minimum guaranteed) in

**INGOTS, STICKS, & ROLLING SLABS;**

ALSO FOR

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# ALUMINIUM.

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**LONDON, E.C.**

AGENTS FOR THE BRITISH ALUMINIUM COMPANY, LIMITED.

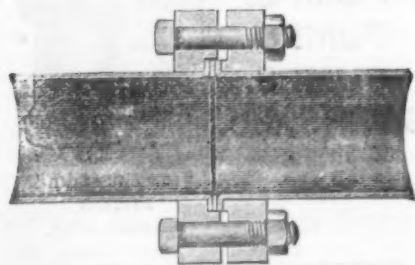
## A. & J. STEWART and CLYDESDALE, Limited. Glasgow, Coatbridge, and Mossend.

WROUGHT IRON WELDED TUBES and FITTINGS for GAS, WATER, and STEAM.  
 Light Lap-welded Wrought-iron and Steel Tubes  
 (SPECIALLY ADAPTED FOR MINES).

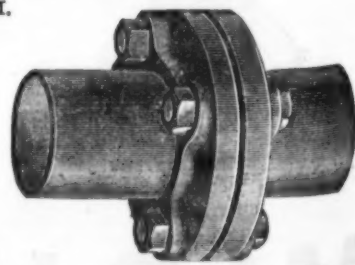
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LAP-WELDED IRON AND STEEL BOILER TUBES  
 FOR LOCOMOTIVE, MARINE, AND OTHER MULTITUBULAR BOILERS.

**STEEL & IRON PLATES FOR BOILERS, BRIDGES, &c.**



SECTION OF PATENT FLANGED JOINT



PLAN OF PATENT FLANGED JOINT

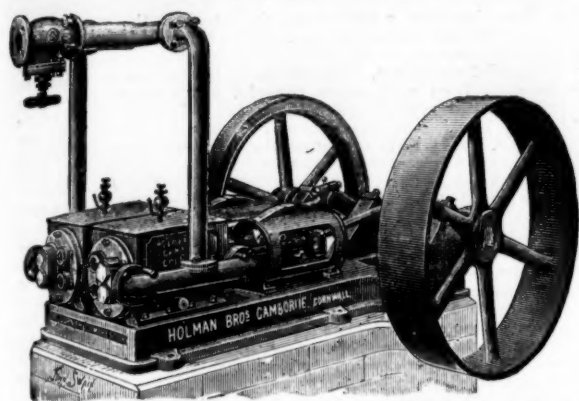
Head Offices: **41, OSWALD STREET, GLASGOW.**



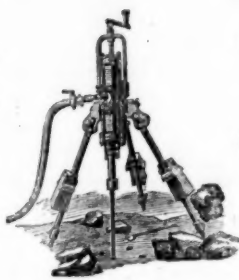
# HOLMAN Bros., Camborne, Cornwall.

ESTABLISHED 1839.

**Patentees and Sole Makers of**  
**"THE CORNISH" ROCK DRILL and "THE CORNISH" COMPRESSOR.**



FIRST  
SILVER MEDAL,  
Highest Award,  
Mining Institute  
Contest, 1881.



FIRST  
SILVER MEDAL  
Highest Award,  
Royal Cornwall  
Polytechnic  
Jubilee Exhibition  
Contest, 1882.

Three Makers  
represented.

Five Makers  
represented.

AWARDED SILVER MEDAL INTERNATIONAL  
INVENTIONS EXHIBITION, 1885.

## RECORD OF WORK DONE

At Botallack Mine, St. Just, Cornwall, **TWELVE MEN** with **TWO** new Patent **CORNISH ROCK DRILLS** drove, sunk, and rose **288 FATHOMS** in **12 MONTHS**, equal to five times the Speed of Hand Labour.

At Wheal Grenville Mine, Camborne, Cornwall, **SIX MEN** with **TWO** new Patent **CORNISH ROCK DRILLS** started from the **150 FATHOMS** level and put up in **EIGHT MONTHS** a **11 FEET** by **5 FEET PERPENDICULAR RISE 48 FATHOMS 5 FEET 6 INCHES**, and about midway drove **1 FATHOM 5 FT.** No communication of any kind was effected until holing to the Shaft brought down from surface.

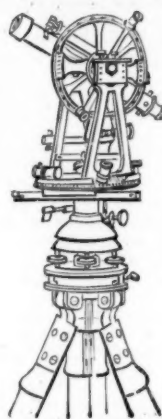
Estimates for **ROCK BORING PLANT** and **GENERAL MINING MACHINERY** on Application.

London Offices: 7 and 9, LEADENHALL BUILDINGS, E.C.

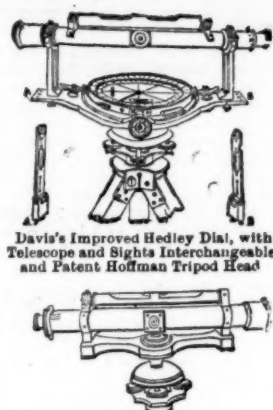
# JOHN DAVIS AND SON,

ALL SAINTS WORKS, DERBY;

118, NEWGATE STREET, LONDON.



Transit Theodolite with Patent  
Hoffman Tripod Head, and  
Trough Compass.



Dumpy Level with  
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**MINING, SURVEYING, AND  
ENGINEERING INSTRUMENTS.**

**THEODOLITES. LEVELS. TACHEOMETERS.**

**Davis's Improved Hedley Miners' Dials, with  
HOFFMAN PATENT TRIPOD HEAD;  
AND ALL DESCRIPTIONS OF MATHEMATICAL AND  
MINING SURVEYING INSTRUMENTS.**

Revised Illustrated Catalogues Free to any Part the World.  
SECTION (A) MATHEMATICAL DEPARTMENT AND SAFETY LAMPS  
SECTION (B) ELECTRICAL DEPARTMENT.

Gold Medal Awarded Mining Exhibition, 1890.  
A. B. C. CABLE CODE, 4TH EDITION.

**AWARDS: CRYSTAL PALACE, 1890; TASMANIA, 1891; KIMBERLEY, 1892.**

# CONCENTRATION.

**The Clarkson-Stanfield Ore Reduction Co. (Limited).**

In the **CLARKSON-STANFIELD** process of Concentrating Refractory and Complex Ores no water is required; dust is reduced to a minimum; the loss of Mineral through water-borne Slimes is obviated.

**OUTPUT  $\frac{1}{2}$  TO 2 TONS PER HOUR, ACCORDING TO SIZE OF MACHINE.**

CONCENTRATOR TO BE SEEN IN OPERATION AT THE COMPANY'S ONLY ADDRESS,

**6, COLONIAL AVENUE, MINORIES, LONDON, E.**

The Machine is superior to Sieves for Sizing Homogeneous Substances, such as Emery, Sand, and Powders, and may be used to great advantage in the preparation of Ochre.

N.B.—The owners of the Carndochan Mine, near Bala, North Wales, will, by arrangement, show their **CLARKSON-STANFIELD** plant working on a Refractory Low Grade Gold Ore.

## NEW PATENTS.

LIST of APPLICATIONS for New Patents relating to Mining Metallurgy, Engineering, Railway and kindred matters, specially compiled from official sources for the "Mining Journal" by Messrs Rayner and Company, Patent Agents, 37, Chancery Lane, London, W.C., who will forward all information regarding them free on application.

- 5781 Sherard Osborn Cowper Coler, 16, Adam Street, Manchester.—Improvements in apparatus for applying zinc or other metallic coatings to iron, steel, or other surfaces.—March 15.
- 5787 William Russell Cummins, Bellevue Warrimote, Fife.—Improvements in steam engines.—March 15.
- 5826 James Howden, 87, St. Vincent Street, Glasgow.—Improvements in or connected with furnace fronts for steam boilers.—March 16.
- 5828 Joseph Crawford, 10, Vieux Street, Dudley, Worcester.—Improved method of casting metallic tops other than iron or steel on to cast iron fenders.—March 16.
- 5832 Daniel Arthur Q. sign, 26, Castle Street, Liverpool.—Improvements in apparatus for filtering water, especially applicable to apparatus for filtering feed water for steam generator.—March 16.
- 5851 David Purves, 55, Chancery Lane, London.—Improvement in tubular steam boilers.—March 16.
- 5871 James McLaren, Dersingham, Norfolk.—An improved water gauge for steam boilers.—March 17.
- 5893 Wilhelm Schmitz, 37, Chancery Lane, London.—Improvements in and connected with steam engines with slide valve gear.—March 17.
- 5895 Joseph Alexander, Brinsford Claxdon, 4, Chancery Lane, London.—Improvements in steam generators.—March 17.
- 5972 William Phillips Thompson, 6, Lord Street, Liverpool.—Improvements in steam valves.—March 17.
- 6001 John Willis Cuffling and John Unwin, Ridgway, near Chesterfield.—An improved mottled string for use on coal corves in coal mines.—March 19.
- 6025 Richard Hareley Williamson, 70, Deansgate, Manchester.—Improvements in or applicable to the flues or furnaces of steam boilers and other furnaces.—March 19.
- 6029 John Hill, 16, Finkle Street, Stockton-on-Tees.—Improved composition of furnace bottoms for heating iron or steel.—March 18.
- 6038 John Tyne Thornton, Atlantic Oil Works, Paddock, Huddersfield.—March 11.
- 6057 Frederick Noel Mackay, 45, Southampton Buildings, Chancery Lane, London.—Improvements in stop valve.—March 18.
- 6074 Robert Lawrence, 115, St. Vincent Street, Glasgow.—A machine for polishing granite blocks.—March 19.
- 6125 Richard Hareley Williamson, 70, Deans Gate, Manchester.—Improvements in or applicable to the flues or furnaces of steam boilers and other furnaces.—March 19.
- 6141 Alfred Fernandez Yarrow, 28, Southampton Buildings, Chancery Lane, London.—An improvement in water tube steam boilers.—March 19.
- 6156 George Rolie and Malcolm Macfarlane Rolie, 6, Lord Street, Liverpool.—Improvements in or relating to steam boilers.—March 21.
- 6227 Frank John Woods, 45, Southampton Buildings, Chancery Lane, London.—Improvement in ore concentrators.—March 21.

## SPECIFICATIONS PUBLISHED.

4541, Wyne, breaking ore, crushing rock, 1895; 5774, Maxim, steam engines, 1895; 6611, Cooper, tubular boilers, 1895; 6919, Keshone Bradley, drilling machines, 1895; 7612, Walker, artificial air, slabs, bricks, &c., 1895; 8043, Sanford, steam generators, 1895; 8045, Willis, motor governors, 1895; 8150, Gifford, valves, 1895; 10823, Gifford, generating steam, 1895; 24110, Gifford, deep boring apparatus, 1895.

The above specifications published may be had of Messrs. Rayner and Co., 37, Chancery Lane, London, at 10d. each, including postage.

**SANTA RITA NITRATE COMPANY (LIMITED).**—The debenture loans having been considerably over applied for the subscription list has now been closed.

## JOINT-STOCK COMPANIES.

### NEW REGISTRATIONS.

THE following are among the joint-stock companies registered at Somerset House since our last notice:—

- Hannan's Golden Pebbles (Limited).**—Registered March 13 by Snell, Son, and Greenup, 1 and 2, George Street, Mansion House, E.C., with a capital of £160,000, divided into 160,000 shares of £1 each. Object: To adopt and carry into effect an agreement expressed to be made between the Hannan Company (Limited) of the one part and this company of the other part, for the acquisition of certain mineral lands in Hannan's Kalgoolie gold field, in the colony of Western Australia, to develop and turn to account the same in such manner as the company shall deem expedient, and to carry on the business of a mining mill, gins, smelting, and metallurgical company in all or any of its branches.
- Brownhill North (Hannan's), Limited.**—Registered March 13 by Ashurst, Morris, Crisp, and Co., 17, Torrington Avenue, E.C., with a capital of £15,000, divided into 150,000 shares of £1 each. Object: To adopt and carry into effect an agreement (referred to in Clause 3 of the company's Articles of Association) expressed to be made between the Anglo-Continental Gold Syndicate (Limited) of the one part and this company of the other part, to acquire, by purchase or otherwise, any gold mines, mineral, water and other rights, grants, leases, claims, concessions, or options of purchase, leases, contracts, privileges, &c., to develop, work, and turn to account the same in such manner as the company shall see fit, and to carry on the business of a mining, milling, smelting, and metallurgical company in all or any of its branches.
- Central Queensland Land Investment Syndicate (Limited).**—Registered March 13 by Sutton, O'Sullivan, and Co., 3 and 4, Great Winchester Street, E.C., with a capital of £5,000 in 48 preference shares of £500 and 1200 founders' shares of £1 each. Object: To adopt an agreement with L. Sachs, and to acquire, work, develop, and turn to account any lands, mines, properties, claims, grants, concessions, &c. The number of directors shall be not less than two nor more than five; the subscribers to appoint the first. Qualification, one preference share. Remuneration, £2 3s. each per board meeting attended and an extra £1 1s. for the Chairman.
- Lowland Gold Mines of Western Australia (Limited).**—Registered March 21 by Birch, 45, Great Winchester Street, E.C., with a capital of £125,000 in 25 shares. Object: To institute, undertake, and carry on the business of financiers, contractors, contractors, capitalists, &c., and to search for, prospect, examine, and explore mines and grounds supposed to contain minerals or precious stones in Western Australia or elsewhere. The first directors to be not less than two nor more than seven—two to be nominated by the subscribers. Qualification, £250. Remuneration as may be fixed by the subscribers or directors.
- Congli Minerals and Diamond Fields of Australia (Limited).**—Registered March 24 by Sutton, O'Sullivan, and Co., 3 and 4, Great Winchester Street, E.C., with a capital of £150,000 in 25 shares. Object: To enter into a certain agreement, particulars of which do not transpire; to prospect and explore mines and ground supposed to contain minerals, res, or precious stones in Western Australia and to search for and obtain information as to mines, mining districts, claims, rights, &c. The first directors to be not less than three nor more than five—are to be nominated by the subscribers. Qualification, 150 shares. Remuneration, £200 per annum for the Chairman, and £50 each for the others, in addition to a percentage of the profit.
- Hannan's Empress Gold Mining and Development Company (Limited).**—Registered March 24 by Wilson, Bristol, and Co., 1, Joseph Hall Buildings, E.C., with a capital of £175,000 in 25 shares. Object: To enter into an agreement to carry into effect an agreement dated March 22, and made between C. B. Phillips of the one part and C. O. Greenwell, for the company, of the other part, for the purchase of certain mines, mining rights, claims, and property in Western Australia, and to work, develop, turn to account, and generally deal with the same. The first directors to be not less than three nor more than seven—are R. J. Prior, M.P., F. H. D. Mau, F. H. Kirby, and H. W. Tugwell. Qualification 200 shares. Remuneration: Chairman, £50 per annum; others £200 each per annum, in addition to a percentage of the profit.
- Lucky Guss Gold Mine (Limited).**—Registered March 25 by Ashurst, Morris, Crisp, and Co., 17, Torrington Avenue, E.C., with a capital of £120,000 in 25 shares. Object: To enter into an agreement with the Cripple Creek Ex-

ploration Syndicate (Limited), to acquire, develop, turn to account, work, and deal with any mines, minerals, mining, water and other rights and claims in the State of Colorado, or elsewhere in the United States. The number of directors shall be not less than three nor more than seven; the first are to be appointed by the subscribers. Qualification, 250 shares. Remuneration, £750 per annum and 5 per cent. of the net profits after paying 10 per cent. per annum to the members, the maximum to be £50 in any one year.

**Cripple Creek Prospector (Limited).**—Registered March 25 by Newson and Poiman, 143, Cannon Street, E.C., with a capital of £1,000 in 25 shares. Object: To adopt an agreement, dated February 6, between H. Emerson of the first part, E. C. Woodford of the second part, and C. O. H. Milner for the company of the third part; to acquire, develop, turn to account, work, and deal with any gold and other mines, mining rights, minerals, claims, leases, concessions, &c.

## CONTRACTS OPEN:

**FOR MINE, QUARRY, RAILWAY, AND ENGINEERING WORK, STORES, &c.**

\*We shall be obliged by being promptly placed in possession of particulars regarding contracts open for competition, and of the results of successful tenders. In the latter case contract prices should be given.

The date given is that by which tenders must be delivered, in nearly all cases further information can be obtained on application at the addresses given. In applying for such the name of "The Mining Journal" should be mentioned as the original source of the information, concerning which further particulars are required.

### HOME CONTRACTS.

**Railway Stores, April 8 (Lisbon).**—For the supply to the Royal Portuguese Railway Company of 2,000 kilograms of mineral oil, 200 gauge-glasses, and sundry turnbuckles (three tenders). Particulars can be obtained at the company's Paris office, 23, Rue de Chateaudun. Tenders to the chief engineer at the company's store, Santa Apollonia, Lisbon.

**Coal, April 14 (Copenhagen).**—For the delivery of 11,500 tons of first class steam coal for use on the Danish State Railways. The conditions of contract may be obtained on application to the Chief of the Marine Department, Copenhagen, 18, at Copenhagen V, or to the Trafikchef for Jut and at Aarhus. Tenders must be left by 1 p.m. on April 14 at above address.

**Sleepers, April 15 (Dublin).**—For the supply of 1,000 rectangular sleepers, 8 feet 1 inch long by 11 inches by 5 inches, for the Dublin, Wicklow, and Wexford Railway Company, in accordance with form of specification to be had on application to Chief Engineer's Office, 1, Westland Row, Dublin. Tenders, sealed, marked "Tender for Sleepers," and addressed to the Chairman, to be sent in by 15th inst., Mr. E. M. Cowan, secretary, West and Row Terminals, Dublin.

**Fuel, April 20 (Hildesheim).**—Tenders for the supply of fuel wood to the 3rd Battalion Gloucester Regiment during their training at Hildesheim, commencing about June 1, will be received at the Headquarters Office, Detonport, until 1 noon on 20th inst. Forms of tender and any further particulars can be obtained on application to the Assistant Adjutant General B. Headquarters Office, Detonport, or to the Officer commanding the corps at Hildesheim.

**Drilling Plant (Belfast).**—Messrs. H. and J. Martin (Limited), Belfast, invite tenders for the supply of plant of the most efficient, modern, and improved type for rock drilling, tunnel work in hard granite.

**Driving Down Slants (Llanelli).**—For driving down slants in anthracite coal 8 feet thick, depth 10 to 12 feet per yard. Full particulars on application to the Manager, Great Mountain Collieries, near Llanelli.

The offices of the London agency of the Western Kainforstein (Limited), French Western Nigel (Limited), and the Transvaal Nigel (Limited), have removed to those of African (Limited), 34, Clements-lane, E.C.



## GOLDEN NEW ZEALAND.

## HISTORY OF THE PAST YEAR.

Statement by the Minister of Mines.

THE following is the introduction to the detailed report of the Hon. A. J. CADMAN, Minister of Mines for New Zealand, as presented to the Government:—

After the general depression in mining which has existed in several districts for years past, it is gratifying to me to be able to state that the prospects for the future development of our mineral wealth present brighter aspects, and are of a more encouraging nature than have prevailed for a long time past. The cause of this depression may be attributed to the want of sufficient capital to properly prospect and open up quartz mining properties. Especially has this want been felt where operations have to be undertaken at deep levels, and large quantities of water have to be contended with. On the other hand, in the alluvial drifts the scarcity of water limits the extent to which hydraulic sluicing operations can be carried on.

In opening out quartz mines, and in the early stages of working them, comparatively little capital is required to make the enterprise remunerative. The gold which is found near the outcrops of the lodes is generally in a free state, and not so much associated with baser minerals as it is at a greater depth. Moreover, the lodes so far have proved richer near the surface than at the deeper levels. The profits derived from working the mines when they were first opened up were consequently greater than at present, while the cost of prospecting at that time was very much less. Some of the quartz mines which have been opened for the last 18 years have now reached such a depth as to require powerful machinery to work them. This involves a considerable outlay, which, together with the cost of carrying on extensive prospecting operations and opening out the mines at deep levels has been beyond the means of most of the mining companies, which have heretofore principally consisted of local shareholders.

The large demand for properties by English capitalists who are anxious to invest their money in mining, and who are now providing funds for opening up some of the older mines in which operations have been suspended for a considerable time past, will be the means of expanding the quartz mining industry, and giving such an impetus to mining generally as has not been felt since the early days of the Thames and Reefton fields. It is, however, asserted by foreign capitalists that sufficient inducement is not given for investing large sums of money in mining ventures, as the tenure is too limited, and the Legislature does not provide sufficiently large areas of ground in one claim. There can be no doubt that our method of quartz mining in the past has been of a primitive nature. Experience is teaching us that, with our system of forming numbers of companies with very limited capital, each having a secretary, mine manager, and, on an average, only from 6 to 10 miners, it is impossible to make dividends for 40 or 50 shareholders. It is, therefore, proposed to introduce legislation to meet the views of capitalists, in the direction of giving them extended areas for their operations. It will be for the House to express its opinion on this subject when the Bill is introduced.

I regret to have to state that gold mining at the Thames has been greatly depressed for some years past, owing to the want of capital to test the value of the lodes below the 500 feet level. It affords me pleasure, however, to be in a position to inform honourable members that an English company has been formed to sink a shaft on this field to a depth of 2000 feet, and to erect a pumping plant capable of lifting 2000 gallons of water a minute from that depth.

The discovery of rich auriferous lodes in the Coromandel district, together with the finding of a large lode of auriferous quartz in the Kapanga Company's mine in a bore which was put down from the bottom of the shaft, about 1000 feet below the surface, has given the shareholders in that company sufficient encouragement to continue the sinking of their shaft. At Reefton new lodes have been discovered during the past year at deeper levels than hitherto worked, containing ore of a highly payable character. This has given an impetus to mining in that locality also. These discoveries at lower depths clearly demonstrate the existence of new lodes of ore in mining properties, some of which were previously deemed valueless.

Dredging as applied to mining is entirely confined to Otago and the West Coast, where it is likely to be greatly used in future for working the beds of rivers and shallow ground, where there are large bodies of water to contend with, and where there is no fall for tailings; and also for working the black sand leads on the ocean beaches. The recent improvements made in dredges, by which the tailings are lifted and stacked some distance away from the stern, has greatly increased the usefulness of these machines, as it enables ground to be now worked remuneratively that could not be done otherwise. The results of dredging on the beaches on the West Coast have not so far proved a great success, owing to the gold-saving appliances being unsuitable for the character of the gold found; but, no doubt, improvements will be made to cope with this difficulty, and when this is done it must lead to the use of a very large number of dredges.

The method adopted at Skipper's, in Otago, whereby dredges are worked by electricity, appears to me to be one well worthy of consideration in other parts of Otago, where steam power is being used. This applies more specially to dredges working on the Clutha River, where there is ample water power available to generate sufficient electricity as a motive power for far more dredges than are at the present time working between Roxburgh and the Benomont Bridge.

Improvements are also being made every year in hydraulic and elevating appliances, enabling ground to be now successfully worked which a few years ago was considered valueless. The extensive areas covered with auriferous gravel which can be worked means of these appliances will afford profitable employment to a large mining population, where sufficient water can be got to command and work the ground.

The recent discoveries to which I have referred will no doubt give more confidence to men to invest their capital in mining ventures, and will be the means of prospecting operations being more vigorously carried on than heretofore. With competent management many of the mining properties recently taken up are likely to prove remunerative ventures, and, although rich returns can hardly be expected from every mine, it is to be hoped that the majority of them will yield fair interest on the outlay.

Considerable attention is being given to coal mining, and there is a steady increase in the output. But as the West Coast is the only place where coal has yet been found in the colony suitable for sending to foreign markets, we must not expect a large export to other countries until such time as the West Coast harbour works are more advanced to admit of large vessels being engaged in the coal trade.

## Mineral Production.

The quantity of gold, silver, and other minerals, including kauri-gum, produced for the year ending December 31 last, will be found in Table No. 1 of the report. The production of gold and silver was 275,792 ounces, representing a value of £894,536, whereas the value for the previous year was £922,881. This shows a decrease in the value last year of £28,345. 720,256 tons of other minerals were produced, representing a value of £398,139, as against a value of £389,018 for the previous year, and the production of kauri-gum was 8338 tons, having a value of £404,567, as against 8317 tons for the former year, which had a value of £510,775.

The quantities and value of the mineral productions for the year were: Gold, £221,615 ounces, value £897,839; silver, 54,177 ounces, value £6697; antimony ore, 44 tons, value £761; manganese ore, 534 tons, value £1156; mixed minerals, 25 tons, value £353; colonial coal, exported, including that which was used in coaling direct steamers to England, 75,004 tons,

value £73,438; coke exported, 107 tons, value £160; colonial coal consumed in New Zealand, 644,542 tons, value £322,271; and kauri-gum, 8338 tons, value £404,567, making the total value of the production last year £1,697,242, as against £1,822,674 for the previous year.

The total value of gold, silver, and other minerals, including kauri-gum, produced in the colony to the end of 1894, was £82,769,652.

## Gold Mining.

Notwithstanding the decrease in the yield of gold last year the present state of the mines shows that the gold mining industry is likely in the future to be greatly extended. The large demand for New Zealand mines as an investment for foreign capital is the means whereby properties, in which mining operations have for several years been suspended, owing to the want of money to develop them, can be again taken up. Fresh ground is also being applied for to carry on more extensive prospecting operations than hitherto, and money is forthcoming to assist to a far greater extent than heretofore in developing our mineral resources. Every encouragement will be afforded those who wish to invest their capital in mining ventures to carry on their operations in a *bona fide* manner; but at the same time safeguards will be provided to prevent large areas of mineral lands being held for purely speculative purposes.

The recent discoveries of auriferous lodes in the Reefton district at deeper levels than hitherto worked have given an impulse to mining in that locality, as these discoveries have demonstrated the fact that new lodes containing ore of a payable character for working will be found at great depths, to take the place of the lodes carried down from the surface, but which have cut out. Many mines which have been given up as valueless will now be tested to far greater depths than heretofore, and by judicious management they will yet be made to yield returns which, I feel confident, will fully recompense the owners for their outlay.

The quantity of gold entered for exportation through the Customs for the year ending March 31 last was 222,931 ounces, representing a value of £889,545, while the quantity exported for the same period of the previous year was 240,702 ounces, valued at £970,220. This shows a decrease last year of 17,771 ounces, but this does not in reality show the total production, as there is a certain quantity of gold manufactured into jewellery in the colony. Of the quantity exported, Auckland contributed 58,029 ounces; Marlborough, 1911 ounces; Nelson, 1633 ounces; West Coast, 85,015 ounces; and Otago, 76,393 ounces. The only district in which there was an increase was Auckland, the export being 5603 ounces more than for the previous year, while in other districts the decreases were as follow:—Marlborough, 351 ounces; Nelson, 546 ounces; West Coast, 13,915 ounces; and Otago, 8512 ounces. Of the total quantity exported last year Auckland contributed 26.02 per cent.; Marlborough, 0.89 per cent.; Nelson, 0.73 per cent.; West Coast, 38.13 per cent.; and Otago, 34.27 per cent.

## Earnings of the Gold Miners.

If we estimate the earnings of the men employed in gold mining on the same basis of computation as adopted in former years—namely, the value of the gold entered for exportation, divided by the number of miners on the different gold fields as returned by the Mining Registrars, we can but approximately reckon the net receipts of the men. The cost of tools and interest on the value of the plant must also be taken into consideration, but as this cannot be ascertained the average value of gold for each man employed must be adopted.

The total number of men employed last year was 11,412, as against 11,553 for the former year—a decrease of 141. The decrease was principally in the Westland district, where the number was 613 less than for the previous year. In Otago, also, there was a decrease of 59. In all other districts there has been an increase in the number employed, especially in the Auckland district, where 461 more men were employed than for the previous year. If we divide the value of the gold entered for exportation by the number of men employed in connection with the gold workings last year, we get an average of £77 18s. 11d., as against £83 19s. 7d. for the previous year—a decrease of £6 0s. 8d. If the value of the gold in the different districts be taken, and the number of men employed in each, it will be seen there was £127 1s. obtained for each miner in the Auckland district, £30 2s. 10d. in Marlborough, £30 2s. 10d. in Nelson, £72 1s. 1d. on the West Coast, and £69 5s. 2d. in Otago. In some places, however, the miners do not depend upon gold mining alone for their living, as they hold land under the occupation system, or have small homesteads on freehold land, and employ portions of their time in cultivation, &c.

## Quartz Workings.

This branch of the gold mining industry is steadily progressing, although the yield of gold from the whole of the mines last year is nearly the same as for the former year. There has been an increase in the North Island, while on the West Coast there has been a considerable decrease. During last year 116,094 tons of quartz and tailings were treated in the Auckland district, which yielded 156,698 ounces bullion, representing an estimated value of £261,746, as against bullion to the value of £219,651 for the former year—an increase last year of £42,095. In Marlborough only 25 tons of quartz and tailings were treated for a yield of 14 ounces gold, having a value of about £54 12s. In Nelson 3554 tons of quartz were crushed, yielding 657 ounces gold, valued at about £2562. On the West Coast 38,370 tons of quartz and tailings were treated, which yielded 18,360 ounces gold, representing an approximate value of £71,604; and in Otago 13,390 tons of quartz and tailings were treated for a return of 5713½ ounces gold, having an estimated value of £22,283. The greatest decrease in the yield of gold from quartz workings last year was from the mines on the West Coast. It amounted to 10,193½ ounces gold, having an approximate value of £42,610. The total quantity of quartz crushed and tailings treated last year was 171,433 tons, which yielded gold and bullion to the value of about £358,250, as against £359,490 for the previous year. The yield last year from the quartz workings was equal to 40 per cent. of the total value of the gold entered for exportation.

It may be interesting to honourable members for me to state that 52 per cent. of the total value of the gold and bullion obtained in the North Island last year was extracted by the cyanide process. This is said to give about 26 per cent. more of the gold in the ore and about 17 per cent. more of the silver at the Waihi Company's works than was obtained previously by the most approved systems of amalgamation. Considerable advances have been made in the cyanide treatment since it was first introduced, and no doubt by further experiments the processes will be greatly improved in future. It, however, requires men specially trained to use the cyanide process successfully, as they must have a knowledge of the chemistry of minerals as well as understand the action of alkaline and acid substances on the ore under treatment, and the percentage of the solvent required to give the best results on the different classes of ore.

## Coromandel.

Owing to a discovery of very rich ore in the Hauraki Company's ground, which formerly belonged to the Coromandel Company, there has been a great demand for mining properties in this locality, and considerable areas of ground have been purchased by English companies, who are providing money to develop their claims. The discovery of this rich auriferous ore was made by Ross and party, who were working on the tribute system, and who, while constructing an adit level to their section of the ground, struck a very rich lode outside the portion of the ground they held, and which belonged to other tributaries—Legge and party—who had done no work on their section. Between the beginning of May last year and January 2 of the present year Legge and party got 3955 ounces of gold, representing a value of about £11,929, and since the company took the ground over from them to August 24 last 694 tons of stone, yielding 15,935 ounces gold, were obtained, equal to about 22 ounces 19 dwts. 5 grains of gold to the ton. This discovery has led to the taking up of a great deal of ground, where very little work has been done for many years, and to the commencement of active operations there. A large amount of prospecting has been done in the Kapanga Mine, which also belongs to an

English company, and recently the returns show a marked improvement. The property known as Scott's, as well as the ground on the Tokatea range, have been purchased by English companies, and are now being worked.

Some of the mines at Kuaotunu give promising returns—as, for instance, the Kapai-Vermont, and this will tend to cause more attention to be given to this field.

During the first year 9936 tons of quartz and 6158 tons of tailings were crushed, which yielded 22,632 ounces gold, representing a value of £62,906, while 265 men were employed in connection with the mines.

## Thames.

There has been a considerable falling-off in the yield of gold from this field during last year. This, however, was fully anticipated, the working in the principal mines being confined to within 500 feet of the surface, below which no prospecting operations can be carried on until more powerful and economical pumping machinery is erected, and a shaft sunk below the depth of the present level. The upper levels having been worked and well prospected, there is little hope of striking any large bodies of auriferous stone until a greater depth has been reached. On the other hand, the rich discoveries of auriferous lodes in the Ohinemuri district have attracted the attention of mining men, and this being a comparatively new field offers a larger scope for carrying on prospecting operations than the Thames field at the present time. A company with a considerable capital has, I am glad to state, been floated in London to provide a powerful drainage plant to drain the water at the Thames to a depth of 2000 feet, which will admit of the field being opened out afresh. Where so large a quantity of gold has already been obtained, there is a fair probability of rich discoveries being made at deeper levels than hitherto worked; at least, this has been the experience on every other gold field where rich stone was obtained at shallow depths.

During the past year 25,971 tons of quartz and 11,938 tons of millcock were crushed, which yielded 20,865 ounces gold, and 10,555 tons of tailings were treated for a return of 1945 ounces gold representing an estimated value of £59,340, while 598 men have been employed in the mines.

## Ohinemuri.

This gold field promises to be one of wide extent, and the yield of bullion is steadily increasing. A number of large lodes are known to exist, containing both gold and silver, and comparatively little prospecting has yet been done on any of them, with the exception of that carried on in the immediate vicinity of Karangahake, Waitakauri, and Waihi. The great bodies of auriferous and argentiferous ore found at the latter place, which get richer as the depth of the workings increase, gives a value to the Waihi Company's property at the present time of about £1,000,000. The large body of payable ore in this company's mine, and the steady returns of gold obtained, have attracted capitalists' attention to this locality, and a number of special claims have recently been taken up with the view of carrying on extensive prospecting operations in other parts of the field. The demand for mining properties, where considerable sums of money are required as a working capital, is greater at the present time than ever it has been since the gold fields have been opened.

The discoveries at the Golden Cross, Waitakauri, have also given an impetus to mining in this locality. The large auriferous and argentiferous lodes containing rich ore mark this as a place where considerable sums of money will be expended in prospecting other lodes, and also where a large mining population will find profitable employment.

During the past year 31,221 tons of quartz were crushed, which yielded by amalgamation 16,572 ounces, and by the cyanide process 76,360 ounces bullion, while 19,837 tons of tailings were also treated for a return of 17,665 ounces, and 31 ounces bullion by amalgamation, making a total of 110,628 ounces bullion, representing an estimated value of £137,699, which is equal to about £1 3s. 1d. per ounce, as against 68,603 ounces bullion, having a value of £107,001 for the former year, which is equal to about £1 11s. 2d. per ounce, while 538 men have been employed in connection with the mines last year. The recent discoveries last year and the good returns from the mines have given a considerable impulse to mining in the adjacent districts, causing extensive areas to be again taken up. It has, therefore, been considered advisable to extend the boundaries of the gold fields in the Hauraki district.

## Waiorongomai.

Very little mining has been carried on during the last year on this field, notwithstanding the numerous lodes that are known to exist containing both gold and silver, and which have to a certain extent been proved to contain sufficient bullion to make them remunerative for working if a suitable process were adopted to extract the bullion from the base metals in the ore. Rich patches of auriferous ore have been obtained from the main line of reef traversing the country, and outcropping for some miles along the range. But this main lode has never been tested at any great depth, although this could easily be done by adit levels.

During the last year only about 16 men were employed on the field, and 891 tons of quartz crushed, which yielded 572 ounces bullion, while 280 tons of tailings were treated for a return of 63 ounces bullion, representing a value of £1711.

## West Coast.

The principal quartz district in the West Coast is the Inangahua, but unfortunately there has been depression in mining there for some years past. It is, however, gratifying to state that this cloud of depression is likely to be lifted, and things are assuming brighter aspects than they have done for some time past. Many of the mines have been worked to a considerable depth; but, until last year, nothing was found of any consequence to afford encouragement to prospect the lodes at deep levels. The lodes that had been worked on the surface were found in some of the mines to get broken up and cut out, and even when they were found to continue to go down, the ore became of too low a grade to prove remunerative for working. This being the case, those who were interested in mining properties became disheartened at paying calls without any likelihood of being again recouped for the outlay.

This state of things existed last year, when a new lode was discovered in the Keep-it-Dark Mine at a depth of about 770 feet below the surface, near where the lode on the upper levels cut out. After sinking on this new lode for 100 feet, it was proved to be of a considerable size, from 10 feet to 12 feet in width, and the crushing recently made from this place show the yield to be from 10 dwts. to 15 dwts. of gold per ton; also on the adjoining mine, the Wealth of Nations, a new lode has been found at a greater depth than hitherto worked, and promises to give good returns. These discoveries have been the means of directing more attention to quartz mining on this field, and properties are being again taken up which before were considered of little or no value.

There has recently been a considerable demand for mines in the Reefton district. A Mr. Ziman, from South Africa, has lately purchased several mining properties with the view of finding sufficient working capital to open them up at greater depths, and to carry on far more extensive operations than heretofore.

At the Lyell an auriferous lode has been cut in the low-level tunnel constructed by the Lyell Creek Extended Company, at deeper levels than hitherto worked, which promises to give fair returns for a time. In the Grey district, at Langdon's, a lode has been discovered from which exceedingly rich ore has been obtained, but sufficient work has not yet been done to ascertain the extent of this shoot of gold-bearing stone. These recent discoveries have given more confidence to men to invest money in opening out the mines on a more extensive scale than heretofore, and to carry on prospecting operations at deeper levels.

During last year there were 41,947 tons of quartz crushed on the West Coast, which yielded 190,815 ounces gold, representing a value of £75,301, while about 414 men were employed in connection with the mines.

(To be continued.)



## NOTES ON GOLD MILLING IN CALIFORNIA.

By ED. B. PRESTON, M.E.

Bulletin No. 8, issued by the California State Mining Bureau.  
(Continued from page 394.)

**A**FTER all the sand, &c., has been removed from the battery, the inside is washed out, and any amalgam found adhering to the sides or linings is carefully scraped off with a case knife and placed with the rest of the amalgam for further cleaning. A bed of dry tailings is then spread over the bottom of the mortar, and the dies replaced exactly as they were before. The tappets are then set, plates and screens put in, the feeder replaced, water turned on, and the battery once more started.

The operation of cleaning up the batteries is performed usually once or twice a month, and in some mills once a week, at which time tappets are re-set and any necessary repairs made; also, any shoes that are too thin or broken are knocked from the boss and new ones substituted. As one new shoe in a battery of old ones causes irregular working, it is best to replace all the shoes at the same time, and if any of them are not worn down thin enough to discard, they may be set aside and used to replace a broken one at some future time. The same thing holds good with the dies, for if they are of uneven height they interfere with the regularity of splash, and the higher die will be pounding iron while the remainder have still a sufficient cushion of quartz.

The amalgam obtained from a clean-up is washed in small batches in the gold pan, to free it from all sand, fine iron, or sulphurets, and then stirred up with an excess of mercury in a wedgewood mortar, bringing all impurities to the surface; this dross is skimmed off and collected for further cleaning. The superfluous quicksilver is squeezed through a straining cloth or closely woven drilling, or through buckskin, and the resulting balls of amalgam retorted. This squeezing is best done by hand. After first thoroughly wetting the cloth or skin, it is laid loosely over a cup or bowl, and a convenient amount of amalgam poured in the centre, enough to make, when squeezed, a ball of 20 to 30 ounces. The ends of the cloth are then gathered tightly together, and commencing near the ends, it is twisted until the amalgam is compressed to a hard ball, the strained quicksilver dropping into a pan of water beneath. It is not good practice to squeeze the balls too dry, as the last quicksilver expressed is heavily saturated with gold.

In large mills the retorting is done in pans placed in an iron cylindrical retort built into a furnace, where the flame passes under and around it. But in the majority of cases in California they used the cup-shaped iron retort. These are made in different sizes, numbered from 1 to 7; No. 1 containing 150 ounces, and No. 7, 2000 ounces. They are made of cast iron, with flat or half spherical lids, which are secured to the retorts by clamps and wedges or thumb screws, the flanges being ground together. From a vent hole in the cover a curved condensing pipe, securely screwed in, extends several feet. The retort is placed in a ring standard, or suspended when retorting, and should always have a space of about 6 inches beneath it. In preparing to retort, the inside is well rubbed with chalk and the balls of amalgam broken up and dropped in loosely; not pressed down into a solid cake, as is sometimes the practice, as that retards the operation. The flanges of the retort and lid are then luted together with a thin paste of flour and water or sifted woodashes and water (the former is preferable), and securely fastened. The extended end of the condensing pipe is placed in a vessel with water, and as this pipe must be kept cool, fresh water is kept passing over it during the entire operation. The retort should never be filled to its full capacity to avoid danger of an explosion through the amalgam swelling and closing the vent. At first a light fire should be started at the top, and the heat gradually increased until drops of quicksilver issue from the end of the condensing pipe. The retort should then be kept at a red heat until no more quicksilver is seen to issue from the pipe, when the temperature should be raised to a bright "cherry heat" for a short time. The retort should be kept covered by the fire during the whole operation. If during the retorting the condensing pipe should suck water, it should be raised momentarily out of the water to permit of the latter flowing out. A better arrangement, and one that obviates this difficulty, is to attach firmly to the end of the pipe a rubber or canvas bag in the water, which will distend itself as soon as the mercury commences to flow, and collapse when the distillation ceases. When the operation is completed, which usually occupies about two hours, if the amount be not very large, the quicksilver is removed and the retort taken from the fire and allowed to cool; the lid is removed and the retort turned over a dry gold pan. If the gold adheres to the retort, a few taps with the hammer on the bottom or the help of a long-handled chisel will release it. Well-cleaned and retorted amalgam should show a good yellow colour. If black spots be seen it is proof that the cleaning was not thoroughly done, and a pale whitish colour shows that it still contains quicksilver. Care should be observed when removing the lid of the retort to avoid inhaling any fumes retained therein. All retorted amalgam should be melted and run into a bar before shipping, as it saves losses incurred by abrasion where the distance is great to the shipping point. The melting is performed in a black lead crucible, which, when new, must first be dried and annealed by placing the inverted crucible and lid in the furnace with a slow fire, which is gradually increased until the crucible is red hot. When ready to commence melting, the crucible is placed on a firebrick in the furnace, after introducing the retorted bullion, in not too large pieces, with borax, and covered with the lid, adding, if necessary, more of the bullion as the metal subsides. After all is melted down, the slag is skimmed off carefully from the top of the metal, which should show a bright surface. It is then ready for pouring. Should the surface not appear bright, but show a scum on top, some lumps of borax must be added, the crucible again covered and heated, when the scum will be slagged and skimmed as before, when it is ready to be poured into a mould. Should the second addition of borax fail to produce a bright surface, a very little nitre may be added with the borax. Before using the mould it should be warmed and smoked on the inside by holding over the flame of a lamp or over a dish with burning resin. The metal in the pot should be stirred before pouring; the stirrer, an iron rod, must be heated before introducing it. The bar, when solid, is turned out of the mould, and any adhering slag is hammered off; it can then be dipped into water to thoroughly cool it, dried, and weighed. Two small chips should then be taken—one from an upper corner, the other from the diagonally opposite lower corner—to be assayed.

## Assaying and Sampling.

Although at present most California mills have their own assays to test the ore and the tailings, the time was not so very remote when it was not considered requisite to do any assaying. The expert millman could tell (?) by horn-spoon test how much his ore would mill to the ton; and if a horn-spoon test of the tailings showed no amalgam, he confidently asserted that all was being saved. It was decidedly a case where "ignor-

ance was bliss." No gold milling can be carried on understandingly without light being thrown on the different results achieved, and which can only be given by careful sampling and assaying. It is not sufficient to know that a certain loss has been sustained. It should be accompanied by a knowledge in what particular part of the operation the loss has been incurred, to enable the operator to remedy the evil; hence the necessity of constant sampling and assaying. In some cases the loss will be found entirely in the coarse sands, indicating that the screens are not fine enough. Again, the loss may be entirely through sliming of the ore, or the missing percentages of gold will be found mostly in the sulphurets. The assay test alone, with correct sampling, furnishes the knowledge.

**Sampling.**—Samples should be taken regularly of the ore as it comes to the mill, as well as of the tailings as they pass off, for without the knowledge derived from these two operations there are no means of controlling the work.

Ore, as it arrives at the mill, is sampled by taking a stated amount (shovelful) from each ore car or wagon, and throwing the samples together in a pile on a clean-swept floor into a small bin. The pile should be shovelled over after breaking the pieces to the size of macadam; or if the pile be too large, cut through it at right angles, throwing the rock from the trench thus made in a pile by itself. This should be crushed or broken to a nearly uniform size, mixed by shovelling, and made into a low, truncated cone, which is divided into four equal parts by making a cross on the surface, and throwing out two diagonal quarters which are again reduced in size, made into a second similar cone, and treated as before. This quartering and crushing is continued until a  $\frac{1}{2}$  lb. sample is obtained for fire assay. Great care must be observed when removing the different quarters to see that all the fine dust is swept up and added to the pile each time, as otherwise very defective results will be obtained. The rest of the ore is returned to the main ore bin. Samples taken in this way from the aprons of the self-feeders are likely to give a more correct average, having been crushed, and the coarse and fine duly mixed. Samples should be taken at regular intervals from the pulp with the water that has passed over all the plates, and also from the concentrators.

Tailings samples should be taken at stated intervals by passing a vessel across the entire width of the discharge, where they leave the mill, without permitting any to flow over, and gathering at each interval an even amount. This is allowed to settle in a bucket, and the clear water then poured off carefully or drawn off with a syphon. The residue is dried and thoroughly mixed, and several packages of 5000 to 10,000 grains each weighed out. In some mills tailings samples are obtained automatically, using their current as the motive power for the sampler, which works by intermittently deflecting a spout through the tailings, where they finally drop from the sluices, obtaining the sample across the entire section of the current.

To ascertain the amount of slimes in the tailings sample, put one of the packages into a bucket, add water, and stir it. After settling two or three minutes, pour off the muddy water into a separate vessel; repeat this operation until the water comes off clear; add a little powdered alum in the vessel containing the muddy water, and when the mud has all settled, draw off the top water carefully and evaporate the remainder. Dry the washed sands of the sample, and pass through different sized screens, weighing the different amounts as they have passed, and assay each size; this will show where the greatest loss is sustained.

To ascertain where the loss in sulphurets occurs, it is sufficient to pass one of the 10,000 grains samples through a 60 mesh wire screen; weigh that which passes through and that which remains on the screen and pan out each lot carefully by itself, from one pan into another, as long as sulphurets can be recovered; then weigh each batch of sulphurets separately.

The use of 10,000 grains is recommended, as every 100 grains is 1 per cent., and each grain is 1-100th of 1 per cent.; it is also a convenient size for obtaining accurate results. By using pulp samples instead of tailings, the amount of sulphurets in the ore may be ascertained.

If the sulphurets assay \$75 per ton, and the quantity per ton is 1.7 per cent., the value of the sulphurets in 1 ton of ore is found by multiplying \$75 by 0.017, which would be \$1.27 per ton. If the loss of sulphurets in the tailings is 11 grains out of the 10,000 grains sample, and the value of the sulphurets is \$75 per ton, then multiply \$75 by 0.0011, and the value of sulphurets in the tailings is found to be \$0.0825 (8 $\frac{1}{2}$  cents) per ton of tailings.

## Mill Assays.

**Amalgamation (Free Gold) Assay.**—Take 2 lbs. (being exactly 1-1000th part of a ton) of ore, crush in an iron mortar, and pass through a No. 60 sieve; remove the gold and other metallic substances left on the sieve, and place in a small porcelain dish containing a little dilute nitric acid, to remove any adhering crusts of oxide of iron, &c., which might prevent amalgamation; these residues are then carefully washed and thrown into the sifted ore, which is then placed in a Wedgewood ware mortar, and mixed with enough warm water to make a stiff paste. To 1 ounce troy (480 grains) of new clean mercury free from gold add a piece of clean sodium about the size of a pea. The mercury thus highly charged with sodium is then thrown into the mortar containing the sample, and the mass ground constantly for an hour, when amalgamation should be quite complete. The mass is then transferred to the gold pan and carefully washed over another pan or tub, in which the tailings are caught and rowashed to save anything which may have escaped. The mercury is collected and transferred to a small dish; if it be much floured and refuse to run into globules, stir it with a small piece of sodium held in the end of a glass tube, which will cause it to run together. The mercury is then washed carefully in clear water, and dried with blotting paper. It is then reweighed, and if the loss exceeds 5 per cent. the assay must be rejected, and a new one made. The mercury is next transferred to a small annealing-cup or crucible, which has been carefully black-leaded inside, covered with a porcelain or clay cover, and volatilised with a gentle heat. When all the mercury has been volatilised, about 50 grains of assay lead are thrown into the crucible and melted, giving it a rotary motion while in a molten state. It is then removed, cupelled, and the "button" weighed. It may be assumed without sensible error that the mercury lost in the operation carried the same proportion of gold as is contained in the mercury recovered; hence the gold contents of the ore will be found by multiplying the weight of the "button" obtained by the weight of the original quantity of mercury, and dividing the product by the difference between the weight of the mercury recovered and the "button." This figure, multiplied by 1000, gives the weight, in grains, of the free gold and silver per ton of ore, which, for all practical purposes, may be assumed to be all gold. Should, however, greater accuracy be desired, hammer the "button" flat and thin, and dissolve the silver from it with nitric acid, and weigh the gold. The difference in weight represents the silver.

**Panning Assay.**—Take 2 lbs. of ore, crush, and pass through a No. 40 sieve; any gold in the residue left on the sieve being set aside. The sample is then carefully panned, and the tailings re-panned, to make sure nothing is lost. This operation will show at once whether the ore is rich in sulphurets or not, and the nature of them. The visible gold should be panned

as free as possible from all the sulphurets, taking care that none is lost. The pan and its contents, together with the residue left on the sieve, are dried by holding over a fire; the contents are brushed into a cone of lead foil, rolled up, melted, and cupelled. The "button" is weighed, and the free gold determined by multiplying its weight by 1000.

The tailings produced in the panning operations should be panned over several times to collect all the sulphurets, which should then be dried, weighed, and their percentage in the ore determined.

Another method consists in not separating the free gold from the sulphurets, but in treating them both together by fire assay, and determining the total value of the gold present in them. The operations, as far as described, are all that can be properly considered as coming under the term of battery amalgamation as practised in California, if we except the use of the rifle and blanket sluices; these are placed below all the plates, and receive a very spasmodic attention in the majority of mills. Blankets are laid in strips, about 16 inches wide and about 6 feet long, overlapping each other in double sets of sluices, set on a grade of about  $\frac{1}{2}$  inch to the foot, washed in a separate water-box. The material thus obtained, with the contents of the rifles, is deprived of its valuable contents by the aid of arrastras, pans, or Chili mills. But few blanket sluices are found to-day in California mills.

On the practical development of the Plattner chlorination process, by Mr. Deetken, in the "sixties," it was demonstrated that many of the low grade quartz veins carried enough gold in their sulphurets to make their working profitable, causing attention to be directed to the concentration of these ores by mechanical contrivances. From the constant and successful use of the gold pan the mechanical application of a similar motion was sought, resulting in the use of the Hendy and similar concentrating machines.

The Hendy concentrator consists briefly of a shallow iron pan with an annular groove on the outer edge and a waste discharge in the centre. It is supported on a central upright shaft passing through the centre of the pan, on which revolves, above the pan, a central bowl to receive the pulp, having two tubular arms extending close to the outer edge of the pan; these uniformly discharge the pulp at right angles from their axis. At a point on its circumference the pan is attached to a crank shaft, making about 220 revolutions per minute. The sulphurets and small balls of amalgam gather in the groove at the outer edge, from whence they are drawn through a gate, which is regulated to be automatic in its discharge. This gate is not opened until the groove is pretty well filled with sulphurets. Two of these machines, driven by one shaft, are required for a 5 stamp battery. The machine needs constant attention; one man can attend to 12 machines on a shift. They have been mostly displaced by the endless belt machines which have developed from the endless blanket and shaking table.

In 1867 the first patents for the revolving belt were issued.\* This was the commencement of the belt concentrators, of which at present the Frue, Triumph, Woodbury, Tulloch, Embrey, and Johnston are representatives. To produce the best results on these machines, all the stuff should be sized.

The Frue Vanner, which has the largest representation in California gold mills, has been frequently described.† It has a side shake of 1 inch, with from 180 to 200 strokes per minute, the belt travelling upward on an incline from 3 feet to 12 feet per minute. The belt is made in two sizes, 4 feet and 6 feet wide, and in the latest patterns as made at the Union Iron Works, San Francisco, has practical arrangement for easily clinging the slope at the upper end. The frames of these modern styles are made of iron instead of wood. The pulp is discharged very evenly over the belt from a distributor near the upper end, just below the point where clear water is discharged in fine jets across the belt. In placing the machine, attention must be given to the solidity of the frame, and that a perfect level be obtained across the belt; further, the pulp and clear water must be distributed in an even depth of about  $\frac{1}{2}$  inch; the grade and upper travel depend on the fineness of the pulp, and must be regulated accordingly.

\* From the records of the United States Patent Office.  
No. 61,426, January 22, 1867. T. D. and W. A. Hedger, Meadow Lake, California. "Revolving sluices for saving metals."  
"The endless apron is made of fabric sufficiently coarse to retain the heavier particles which it receives from the speed apron, beneath which issues a stream of water."  
Claim 3. "Separating the ore by passing the valuable portion up the incline and the debris down to the foot, as waste matter, as described."  
No. 65,499, July 9, 1867. George Johnston and Edwin G. Smith, Auburn, California. "Amalgamator and concentrator."  
"The pulverised ore or tailings passes to an endless travelling and shaking canvas belt, which ascends against a stream, carrying the heavier particles to be discharged into a box, whilst the lighter ones are carried off."  
Claim 1. The revolving belt or apron (P), with its raised edges (O), having a shaking or rocking motion from side to side, substantially as used for the purpose herein described.  
No. 239,091, March 27, 1881. Judson J. Embrey, Fredericksburg, Va. "Ore concentrator."  
† See Sixth Report of State Mineralogist, page 92, article on "Concentration," by J. N. Adams, M.E., and Eighth Report, page 718, "Milling of Gold Ores," by J. H. Hammond, M.E.

(To be continued.)

## BRITISH GUIANA'S GOLD INDUSTRY.

The following is the amount of gold entered at the Custom House, Georgetown, for shipment by the R.M.S. *Eden*, which left on the 12th ult., and the names of the shippers:—

	Ozs.	dwt.	grs.	
Colonial Bank ...	1035	8	20	
British Guiana Bank ...	1800	6	0	
Total ...	2835	14	20	Total Value \$50,358-50

The following are the returns of gold entered at the Department of Mines for the weeks ending:—

	February 29.	March 7.
	Ozs. dwt. grs.	Ozs. dwt. grs.
Barama ...	16 11 0	144 6 3
Barima ...	258 10 1	287 9 28
Coyuni ...	194 0 18	676 16 11
Esequebo ...	172 7 5	364 18 16
Groete Creek ...	18 1 0	20 18 4
Mazaruni ...	49 19 22	17 15 4
Potaro ...	261 10 18	673 14 9
Parani ...	25 4 1	8 16 20
Total ...	996 5 2	2194 16 3

Export of gold, January 1 to March 16:—

	Ozs.	dwt.	grs.	
1896 ...	13,661	16	17	at \$243,038-47
1895 ...	15,179	18	4	at \$269,618-57

ALBERT MINES SYNDICATE.—The Coolgardie Mining Review of February 22 has the following:—"On January 11 we reported favourably upon a claim originally known as the Old Chum, now rechristened the Herbert Gold Mine, and we are glad to inform our readers that some very high grade rock has been struck on the property. We do not often have much to say in favour of a claim, but when we do it is right."



## BRITISH COLUMBIA.

By W. PELLEW HARVEY, F. Mem. N. Eng. Inst. M. &amp; M.E.

(Concluded from page 402.)

In the Slocan, reached either from Kaslo or Nakusp, are situated many silver lead mines of great prominence, and to-day, as a whole, is perhaps the most prosperous mining field in West Kootenay. Rich silver lead ores were discovered here in 1890; since then the progress has been phenomenal, and the grade of the product equally so, the variation in produce being on an average from 50 to 150 ounces of silver, and from 40 to 75 per cent. of lead per ton, without any gold of value. A good deal of development work has been done on several mines, the most notable one being the Slocan Star. Several thousands of tons of ore of the value mentioned have been shipped from this mine alone, and already the owner has made a fortune out of the proceeds. The property was acquired when slightly developed for a nominal figure; to-day, by dint of good management and a good property, refusals have been given for cash offers of \$1,500,000. There are two classes of ore in this mine; its concentrating and shipping, taking the whole, 25 per cent. would compose the former, the latter assaying 125 ounces silver and 74 per cent. lead. This is now being shipped to smelters in the United States, and stands a freight and treatment charge of about \$20 per ton. There are many good properties in this locality, some of the present shippers being the Idaho, Cumberland, Reco, Noble Five, Wonderful, Mountain Chief, Good Enough, Alpha, and many others, the average value of the product, according to Customs and other returns, being 100 ounces silver and 60 per cent. lead per ton of 2000 lbs., the actual returns of a mixed shipment sent to the Omaha and Grant smelter amounting to 2114 tons, after allowing for all costs, gave 241,336 ounces silver and 1224 tons of lead, or an average of 114 ounces and 59 per cent.; this, with silver at 67 cents per ounce, and lead at 3 cents per lb., means \$235,135 value. I could give many more figures, but these will show what is being done with the mines practically undeveloped.

In 1893 I made assays of the various ores sent by the Provincial Government for the Exhibition at Chicago. The result will probably be of interest:—

	Ounces Silver.	Per cent. Lead.
18 samples received from Ainsworth Camp averaged .. ..	58	and 53
17 samples received from Slocan Camp averaged .. ..	178	61
8 samples received from Illecillewaet Camp averaged .. ..	111	64
35 samples received from East Kootenay Camp averaged ..	45.50	\$4.30 gold.

The average assays of specimens from the following mines not included in the above list, viz:—

Best, Lucky Jim, Great Western, Washington, Northern Belle, Whitewater, Wellington, Blue Bird, Reco, Bonanza King, Payne, and Dardanelles, being of the enormous value of (average) 237 ounces of silver and 58 per cent. lead per ton of 2000 lbs.

In the Slocan to-day at Springer Creek, on the south end of Slocan Lake, big regions of dry silver ores are being discovered carrying much value in gold and silver, and are likely to create much excitement in 1896. The discovery of this dry ore belt will materially assist the mining and smelting industry.

After reading these notes on the Slocan, it will be apparent to anyone that there is a great future before that region. Mining costs from \$4.50 to \$15 per ton in the province, the former being for the Slocan ores and the latter for Nelson and Rossland, where the rock being mined is especially hard.

## Rossland and Boundary Districts.

So far I have dealt with the Illecillewaet, Slocan, and Nelson Mines only, but equally encouraging are the prospects in the districts named above. During the past two years rich auriferous copper mines have been found near Trail Landing at Rossland and vicinity, and have naturally attracted the attention of mining men, and caused a rush to these sections. The ore bodies are enormous, the grade very variable. The country rock is diorite; the ore found is a heavy sulphide or pyrrhotite, containing at the surface from traces of gold to \$5, and even \$50 per ton, and from 1 to 6 per cent. copper, with scarcely any silver. The extent to which these mines have already been worked is an answer as to whether they will pay, the daily production of one mine alone—the Le Roi—being 90 tons. The War Eagle, Iron Horse, Cliff, and many others are also shippers, with many more likely ones. It is said that the gold found in these mines is not equally disseminated; streaks are to be found giving high returns and others on the contrary, and singular as it may appear, the writer has seen pretty specimens of free gold associated with this sulphide, and massive ore at that; there are white nodules of quartz intermixed with the ore, and here is found the answer to the problem. This ore is being matted on the spot, the product concentrating from 9-10 tons to 1 ton of ore, of an assay value bearing closely on the ratio of concentration as compared to the original ore. The Cassel Gold Extracting Company have found the extraction equal to 85 per cent. of the gold contained, but the amount of acidity and the copper has combined to throw over the chances of obtaining economic results with this treatment, especially as the outside smelting houses charge but little for smelting, as the iron supply is invaluable for admixture with other ore, and give 98 per cent. of the assay value for the gold contained by fire assay.

## Cost of Smelting.

These charges vary from \$7 to \$12.50, according to the nature of the ore and demand for fluxing purposes, the credit being 98 per cent. gold, 95 per cent. silver, and 90 per cent. of the lead contained, based on New York prices at day of sale.

It costs for transportation of ore to Tacoma from	Per ton.
Slocan, &c. .. ..	\$11.00
do. do. .. ..	Everett .. 10.00
do. do. .. ..	San Francisco .. 13.50
do. do. .. ..	New York .. 18.00
do. do. .. ..	Liverpool (Eng.) .. 21.00
do. do. .. ..	Swansea .. 21.50
do. do. .. ..	Vancouver .. —

## Ore Shipped.

Last year some 7800 tons of ore were shipped, the average net value being \$50 per ton. The estimated value of ore, matte, and concentrates for the current year is put at \$10,000,000, based on the present shipping capacity of the producers, to say nothing of the probable revenue from new mines.

The following from the Minister of Mines report for 1895 may be of general interest:—Gold mining engaged the attention of, on the average, 1050 white men and 979 Chinese and Japanese, besides those engaged in Trail Creek division, the newest as well

as the richest in the province, but for which, unfortunately, no gold returns were sent in. The output of the others was, by districts, as follows:—Cariboo, \$282,406; Cassiar, \$22,575; East Kootenay, \$17,575; West Kootenay, \$10,520; Lillooet, \$40,683; Yale, \$237,311; a total of \$636,544 of the yellow metal, exclusive of the Trail Creek division as previously mentioned. Of this total all came from placers except \$135,000 from the quartz mines at Fairview and Camp McKinney. Even without Trail Creek the returns for 1895 are the largest since 1887, new methods having brought about a revival of the industry in temporarily abandoned fields. Since the beginning in 1885, \$55,000,000 in gold has been taken from the fields of this province. Appended to the gold statistics is the statement that in 1895 the gold, silver, and lead in the ore from Kootenay was estimated at \$2,175,000.

## Trail Creek.

Gold Commissioner N. Fitzstubs gives valuable data as to the operations in each of the several divisions of West Kootenay, but space prevents notice of them at present, except Trail Creek, upon which the reports he presents are particularly timely, because they bear upon a matter now before the legislature. He gives the following from Mr. H. C. Jackson:—

"During the year 1895 the Trail Creek mining division has experienced a most wonderful development. As evidence of this the following facts may be recited:—Two thousand mineral claims were recorded at Rossland, making a total of 2200 live mineral claims in the division on the 31st instant. The population of Rossland and surroundings a year ago was about 300; now it is estimated at possibly 3000. The value of the ore produced in the sub-division in 1894 was about \$125,000, in 1895 it exceeded \$1,000,000, while in 1896 it is estimated that it will be from \$3,000,000 to \$5,000,000. The railways operating in the sub-division in 1894 were the Nelson and Fort Sheppard Railway and the Columbia and Kootenay Railway. Now, at Trail, a narrow gauge railroad is in course of construction for the purpose of connecting that town with the mines at and near Rossland.

"A smelter, of a daily capacity of 250 tons, is now completed at Trail, and expects to 'blow in' about February 1, 1896. The War Eagle and the Centre Star Companies have announced their intentions of erecting smelters of their own at or near Rossland, which will together have a capacity greatly in excess of that already built at Trail. It is almost certain that two more railroads will be built into Rossland during the coming year—the Red Mountain road, from Northport, Wash. (a branch of the Spokane Falls and Northern) and a branch of the Canadian Pacific Railway from Robson. About 40 miners were employed in the shipping mines of Rossland in the winter of 1894-5. About 500 men are now at work in the same localities. During 1874 no properties were being worked except the Le Roi, War Eagle, Josie, Nickel Plate, and O. K., all situated within a short distance of the town, except the last-named, which is about 1 and 1½ miles west. Throughout 1895, and at the present time, dozens of mines are employing men, 10 or 15 of which can ship ore, if they so desire. These mines lie in all directions from Rossland, and some of them across the Columbia River. Properties outside the immediate vicinity of Rossland are probably employing 200 men at the time."

In my article, no reference has been made to the hydraulic mining now exclusively employed in the Cariboo, the mining in East Kootenay, Yale, Osgoos Boundary, Alberin, and Cariboo, as well as the occurrence of quicksilver ores at Savona's Ferry, and the milling of the products will be treated in another issue if *The Mining Journal* will give the writer the desired space.

## MEETINGS OF MINING COMPANIES.

## MUNTZ'S METAL COMPANY, LIMITED.

The annual meeting of this company was held at the Queen's Hotel, Birmingham, on Monday.—Mr. A. KEES, the Chairman, who presided, in moving the adoption of the report and accounts, said that the shareholders would have observed that the profit for the year amounted to £6767 15s., and, as their reserve fund was created for the purpose of equalising dividends, they proposed to take £4000 from that fund to enable them to pay the same dividend as they paid for 1894. The company's works and plant had been maintained in an efficient state of repair, and were in good working order. They would expect him to make some remarks with regard to the future, but they all knew how difficult it was to form an opinion as to the prospects and condition of trade. Speaking for himself, he saw no reason why they should not do better in the future than in the past, and he was disposed to take a hopeful view of the company's present position.

Sir H. WIGGIN seconded the motion. Alderman BAKER expressed some surprise at the directors recommending the payment out of the reserve fund of £4000, to make up a dividend of 7½ per cent. for the second half-year. It might be all right, but they could not go on doing that sort of thing for many years.

Mr. NELSON said that he quite approved of the proposal to make use of the money which had been expressly set aside for equalising dividends.

Other shareholders endorsed Mr. Nelson's opinion. The CHAIRMAN, in reply, repeated what he had said as to the object of this reserve fund, and said that the position of the company financially, in his opinion, compared favourably with that of any other trading concern. They would have liked it better, it was true, if they had made more than £6000 profit in the year, but he was hopeful of better results in the future. There were many circumstances which might occur to justify that view; but, on the other hand, there were circumstances which might operate against it. He was as sorry as any gentleman in that room could be that they had had to take £4000 from the reserve fund; but he would again emphasise the fact that the reserve in question was intended for the purpose of equalising their dividends. In addition to this reserve fund they had £53,000 invested outside the company, and in order that this sum should not be a floating one they had sold out these investments, with the result that the £53,000 had realised over £55,000. That money would be placed out at a safe rate of interest, and would be available for any purpose when it was required.

The motion was carried unanimously, and a dividend of 7½ per cent. for the half-year on the ordinary shares, making, with the 5 per cent. interim dividend for the first half-year, a 10 per cent. dividend for the year, was declared.

Mr. NELSON proposed, and Mr. PEARSON seconded the re-election of Mr. P. A. Muntz, M.P., as a director, which was carried unanimously.

Mr. MUNTZ, M.P., in returning thanks, said that, as one who had a larger stake in the business than any other shareholder, it was a matter of great regret to him that the company had not done better. He quite agreed with the Chairman with regard to the soundness of the business and the position and prospects of the company. He did not see why the company's future should not be quite as good as its past had been.

On the motion of Mr. JOSEPH ASH, seconded by Mr. J. B. MANLEY, Sir H. Wiggin was unanimously re-elected a director.

Sir H. WIGGIN, in reply, said that he had been 32 years a director, and should have taken that opportunity of retiring if the company had made a profit of 15 or 20 per cent. He had, however, such con-

science in the concern that he intended to remain on the board until they again made 10 per cent. With regard to Alderman Baker's remarks, he would point out that they had £16,000 left in the bank for equalising dividends, and £55,000 besides. At the time of the great boom in copper the company had large stocks in hand, and these were sold out. The £20,000 extra profit they made that year was invested outside the business, and had remained intact until the present year.

A vote of thanks to the directors was then cordially agreed to. The CHAIRMAN, replying, said that he did not hold out any hope whatever of any increase of the 10 per cent. dividend. He thought 10 per cent. was a reasonable dividend on a trading company, and he sincerely hoped that they would be able to continue on that line.

## THE NEW ELKHORN MINING COMPANY, LIMITED.

The statutory general meeting of the shareholders in the New Elkhorn Mining Company (Limited) was held at Winchester House, E.C., on Tuesday, Mr. J. W. HART, a director, presiding. The SECRETARY (Mr. Charles Pakeman) read the notice convening the meeting.

The CHAIRMAN said: Gentlemen—I regret to state that our Chairman will not be here to-day, and I equally regret that I am called upon to take the chair at so very short a notice; but as this is a formal meeting, called in accordance with the statute, and not for the ordinary course of business, I trust that the few facts I am able to lay before you will suffice to give you the fullest information we have received up to date. Of course, at this meeting no resolutions can be proposed, but the directors are very desirous to give you the fullest information they can discreetly without in any way compromising the affairs of the company. You remember that on December 3 of last year a resolution to reconstruct the company was passed, and on the same day the directors took steps to register the new company. Therefore, the new company was registered on December 3, and on December 10 the applications for the Priority shares exceeded the total number to be allotted. As a consequence, some of the applicants had to be disappointed, but we got the capital we required. The next step necessary was to acquire the property, and that had to be done before December 31. The amount to be paid for the new property was paid on that date, and we immediately came into possession. Therefore, you see there was only an interval of something like three weeks from the date of the reconstruction of the company, and the acquisition of the new property, and I am pleased to tell you, through our solicitor, that we know the whole of the titles are in perfect order, and we are now in full possession. The most important part of the business, following on our taking possession, was to secure the services of a competent manager. We had great hopes of securing Mr. Molson, who had been in charge of the property for several years, and who had conducted the management of the mine satisfactorily, but unfortunately Mr. Molson could not take up his residence in Colorado, having entered into arrangements to go elsewhere. He, therefore, resigned his position, but I am very glad to say that up to the last he took a very great interest in installing the new manager, and doing all that was necessary to continue the working of the old property. It is unfortunate that at this meeting we cannot pass a resolution thanking our late manager for the services he has rendered this company for a number of years. I think every shareholder has reason to appreciate to the fullest extent Mr. Molson's value. We not only had a very faithful manager, but he had also been eminently satisfactory so far as dividends were concerned, of which we are deeply indebted to him. Well, we had to direct our attention to securing a new manager, and with the assistance of Captain Plummer we engaged Mr. Frank Robbins, a gentleman of great experience, and one who was highly recommended to the company. Necessarily this involved a considerable loss of time before we could commence what I may call full operations at the mine. Mr. Robbins took charge on February 18. Captain Plummer, I may also tell you, has again visited the mine, and decided upon the best mode of development in the future in conference with Mr. Collins, one of the vendors, and Mr. Kyle. Then, again, Captain Plummer conferred with Mr. Robbins, when he was permanently appointed, and his recommendations Mr. Robbins fully confirms, and having already proceeded to do that which was necessary by way of ordering new machinery, and making preliminary arrangements to enable him to carry on the development work that was decided upon, Mr. Robbins made it his first duty to go to Chicago, and visit Messrs. Fraser and Chalmers with reference to the new machinery that was wanted. Having made the best arrangements he could be returned to the mine. The object of relating these facts is to show you that these arrangements materially encroached upon the three months since we took possession of the mine, because it was not until nearly the end of February that Mr. Robbins returned to the mine to really commence active operations that had been decided upon by Captain Plummer. The report Captain Plummer made when he kindly again visited the mines was circulated amongst you on the formation of the new company, and I am glad to say that the captain there confirms the favourable opinion that he formed when he first visited the mine before the property was purchased. On January 27, he writes: "I think, taken on the whole, the mine, if anything, is looking better than when I saw it last"—that is, when he visited the mine in December, or rather at the end of last November. Mr. Robbins, in like manner, has been instructed from London to convey to us his impressions as to the property, and to give the directors any other information he can during the short time he has been in charge. Yesterday morning we received a batch of letters from Mr. Robbins, and I will read an extract from the one dated March 16. He goes on to say "that the ore beds exist on your holdings have been fully demonstrated. Considering that from one small triangle 1-15 acres, by no means yet exhausted, and from one ore plane so far discovered no less than some 2750 tons of ore has been extracted, yielding nearly \$80,000, it will be hardly necessary to point out the prospective value of your holding. Have not been disappointed in any of the new prospecting drifts." These are extracts from Mr. Robbins' letter which was received yesterday morning, but a cablegram, dated March 30, states:—"Ore discovered. No. 4 east is developing large body of low grade ore. No. 7 and No. 3 have appearance of good bodies of ore. Prospecting vigorously carried on. Prospects are encouraging." This telegram and the extract from the letter which I have received convey to you the latest information we have from the mine, and it is hardly necessary for me to say that so far as we can gather from the reports we have received from Captain Plummer, and the other information I have read to you, it is the opinion of the board that we have a prosperous future before us. In reference to the old mine, as I have already mentioned, Mr. Molson retired from the management, and Mr. Kelly has been appointed to act in his stead. Of course Mr. Kelly has only just arrived there, and therefore, he has not been able to communicate to us any special report. But I do not think it is necessary, because we have been fully informed by Mr. Molson of the position of the property, although it would be satisfactory to know that the mine was still working with a little profit. The bottom workings are not in any way encouraging, but still we hope to get further small returns from the old workings above, and our new manager is going to direct his attention more particularly to these. As I have said before, it is the desire of the board to give you the fullest information possible, and if I have omitted to refer to any particular point on which you would like to ask a question, I shall be very pleased to give you any information that is in our power. (Applause.)

No questions being asked, the meeting then concluded.

LYDENBURG MINING ESTATES (LIMITED).—The annual general meeting of the company will be held at Johannesburg on May 11 next.



## OREGUM GOLD MINING COMPANY OF INDIA, LIMITED.

The ordinary general meeting of the Oregum Gold Mining Company of India (Limited) was held on Tuesday, at the Cannon-street Hotel, Mr. MALCOLM LOW (the Chairman of the company) presiding.

The SECRETARY (Mr. John Garland) read the notice calling the meeting.

The CHAIRMAN said that he would summarise the work done during the past year. They had sunk and risen 3757 feet in shafts and winzes, driven 6952 feet in levels and crosscuts, stopped 4166 fathoms of ore, milled 53,420 tons of quartz, and treated 55,945 tons of tailings. These figures showed that large as had been the operations in past years, they had last year been greater than at any period in the company's history. The result was the production of 70,349 ounces of gold, realising £263,461, a higher amount than had been realised with the exception of 1893. In the past year they had done more work than in the year before, but they had obtained more gold. There were two points which were not quite so satisfactory—one being the diminution in the average value of the quartz. He supposed, however, in a great mine like the Oregum they could not expect precisely the same values, and he hoped that in 1896 there would be a turn on the upward scale. The second point was that the bottoms of Wallroth's and Taylor's shafts were not looking so well as they would like. In Wallroth's shaft they had gone through a good deal more poor ground than they had anticipated. Speaking, however, as one of the directors he did not hesitate to say that he refused to take any gloomy view of the situation, believing that the apparent dip of certain of the original shafts in the levels above warranted the expectation that there would be improvements in both shafts. The balance-sheet that they had at the close of the year showed no less a sum than £27,576 laid out in unexhausted stores and materials, or an increase of nearly £11,000 over the value of the stores at the close of 1894. The profit and loss showed that £4500 of the year's profits had been set aside for the purchase of additional compressors and machinery, and £3157 had been written off the mining and general expenditure, and £1868 for depreciation of machinery buildings and plant. A commencement had been made towards a reserve fund of moderate dimension by placing £5000 of the profits to reserve. They had also succeeded in effecting a reduction of expenditure to a very substantial degree. Speaking in 1893 he had emphatically pointed out that if the quality of the ore remained the same a decrease of expenditure would follow steadily upon an increase of output. The output had very largely increased since then, but the quality of the ore had not remained the same. It had for a time, unfortunately, diminished, but in spite of that the ratio of expenditure to work done had very greatly improved. In 1894 they had worked 4s. 1d. per ton cheaper than in 1893, and in 1895 they had worked no less than 8s. 4½d. per ton cheaper than in 1894. (Applause.) That was a feature of administration he was exceedingly glad to see, and it had not been effected without great care and pains. As to the dividend they had already paid—7s. on each preference share and 5s. on each ordinary share—the remaining dividend of 2s. 6d. on both descriptions of shares they were now asked to pass would bring up the total dividend for the year to 9s. 6d., or 47½ per cent. on the preference shares, and 7s. 6d., or 37½ per cent. upon the ordinary shares. The following telegram had just been received from the mines:—"Taylor's shaft, width of lode 4 feet; is composed of schist, little quartz; quartz assayed 19 dwts. per ton. 860 feet level south, width of lode 18 inches, assaying 5 ounces per ton. Winze No. 1, width of lode 12 inches, assaying 1 ounce 1 dwt. per ton. 860 feet level north, width of lode 2 feet, assaying 1 ounce per ton. Winze No. 1, width of lode 12 inches, assaying 19 dwts. per ton. 760 feet level south, winze No. 3, width of lode 21 inches, assaying 3 ounces per ton. Wallroth's shaft, 960 feet level south, width of lode 4 inches, assaying 12 dwts. per ton. 960 feet level north, width of lode 6 inches, assaying 7 dwts. per ton. 460 feet level south, at the junction of split with reef south, width of lode 10 feet, assaying 1 ounce 2 dwts. per ton. 460 feet level north winze No. 2, width of lode 2 feet 6 inches, assaying 1 ounce 7 dwts. per ton. 215 feet level north crosscut has cut the lode east, and the lode 3 feet, assaying 9 dwts. per ton. Low's shaft, 810 feet level south, width of lode 3 feet, assaying 18 dwts. per ton. 810 feet north, width of lode 2 feet, assaying 10 dwts. per ton. Probyn's shaft, bottom north level, width of lode 2 feet, assaying 12 dwts. per ton. Winze No. 1, 1050 feet level north, width of lode 2 feet 6 inches, assaying 9 dwts. per ton." The chief local superintendent had resigned his appointment, and in his place Mr. W. J. Hambley had been appointed. Mr. Hambley was an old and trusted servant of the company, and the board anticipated great benefits from his administration. The Chairman concluded by moving the adoption of the report and accounts. (Applause.)

Mr. A. S. B. OATLEY seconded the motion.

Mr. EDGAR TAYLOR said: Gentlemen—I have to-day to take my brother Mr. John Taylor's place in putting before you a description of the work that has been done at your mine during the year 1895. Before I deal with the different points underground I must briefly refer to the very marked increase in the amount of development work done in the mine. The aggregate of 10,710 feet of driving, sinking, and rising shows an increase of 2030 feet over the amount done in the previous year. And as a result of this exploratory work it is satisfactory to be able to record that although over 1000 fathoms more ground has been broken in stoping, there is a substantial increase in the estimate of reserves of ore. I will now describe the underground workings, beginning at the northern end of the property. Probyn's shaft has been sunk during the year under review 104 feet, the total depth now being 1154 feet. This shaft has not been deepened since August last, and it has been decided that this northern portion of the property can now be properly commanded by the extension of northern levels from Low's shaft. It is not intended, therefore, to continue the cost of sinking here, and, as the directors' report points out, the expenses of pumping will be obviated. The 1050 level south was driven during the year 45 feet on a small branch; the cross-course was then intersected, and the level was extended through it and driven a further 216 feet. The 950 south has been driven 44 feet during the year, but here the lode is pinched and the level has been temporarily suspended; this will later on be communicated with Low's shaft. The superintendent's report on page 28, referring to Probyn's shaft, points out that although a shoot of quartz of considerable length and distinct formation has been opened up in this part of the mine, unfortunately it is of low grade. Further to the south Low's shaft has been sunk during the year 180 feet to the 810 feet level. Since January the 810 feet level south has been commenced and driven 38 feet; the lode in this level has averaged 4 feet in width, worth 8 dwts. The cable message gives the lode in this level as 3 feet wide, assaying 11 dwts. The 710 feet level south was extended during the year 227 feet, the last 146 feet of this drive (which is to the south of an oblique crosscut) has been on a lode 3 feet 2 inches in width, assaying 10 dwts. A level has been driven back north on the lode from the oblique crosscut a distance of 75 feet on a lode 3 feet in width, worth 9 dwts. The lode in the 610 feet level having proved poor, a crosscut east was driven which intersected a part of the lode lying in that side; from the point of intersection a level north has been driven 165 feet; average width of lode being 10 inches, and the value being 1 ounce 3 dwts. The south portion of this level was driven 144 feet on a lode averaging 9 inches, worth nearly 1 ounce. The winze below this level, which has been communicated to the 710 below, has exposed a good lode, averaging 2 feet 3 inches in width, with an average value of 1 ounce 7 dwts. The two rises and the other winze at this level have opened up a lode of fair size, and assaying over 1 ounce. Wallroth's shaft has been sunk during the year 168 feet; the total depth is now sufficient for the 1160 levels to be commenced. The lode in this shaft for the first 22 feet below the 960 level averaged 3 feet 10 inches in width,

and was worth nearly ½ ounce, but below that depth it has been of a very intermittent character, and poor in value. You will remember that my brother, Mr. John Taylor, spoke last year of the workings in and about Wallroth's shaft being in a poor zone of ground, and that he looked with confidence to the poor zone of ground being pierced in depth; this wished-for result has not yet taken place. I am, however, as confident, as was my brother, that we shall see an improvement in depth at Wallroth's. First of all I may say it is quite a usual thing for poor zones to be met with in metalliferous mines, sometimes extending to considerable depths, and the reefs again proving richer than ever below; and, secondly, I can show you that this particular lode does extend both wide and rich to greater depths than Wallroth's has yet attained. At the Nundydroog Mine to the north a discovery has been made in one of the deepest levels, the 1080, and a shoot of ore extraordinarily wide and rich has been opened up for a length of over 300 feet actually beneath ground that has been as varying and as impoverished as the ground we have had about Wallroth's. At the Mysore Mine to our south we have the lode, identically the same lode as we are working at Oregum, going down to much greater depth than we have yet reached at Wallroth's and proving to be both wide and rich; this, I think, sufficient to show you why I look with confidence to improvement in depth in this section of your mine. The north levels—the 1060, the 960, the 860, and the 760—have been extended rapidly during the year under review, but these have not been in the pay shoot, the lode for most of the distance driven being narrow and of low quality. With regard to the levels south of the shaft—the 1060, the 960, and the 860—the remarks I have already made apply to these points also, for they have not yet reached the limit of the poor zone. In the upper part of the mine a discovery has been made in a crosscut east of the 460 level, south of Wallroth's. Here a separate part of the lode is found to be lying to the east, and a considerable section of stoping ground has been opened up upon it. The cable message speaks of the lode at the point where this separate part of the lode comes into junction with the main lode, as being 10 feet wide, worth 1 ounce 2 dwts.; and, farther, the cable mentions that the winze under this 460 level is on a lode 2 feet 6 inches wide, worth 1 ounce 17 dwts. I now come to Taylor's shaft, where, during the year, rapid development has taken place with most excellent results. The shaft has been sunk on the course of the lode 228 feet during 1895, and since January a further 91 feet to the present depth of 951 feet. The average width of the lode in the shaft, the whole distance of 228 feet, was 2 feet 10 inches, while the ore yielded the fine assay of 2½ ounces. The last few feet, however, the lode has been pinched to a width of a few inches. We hope this is only a temporary decrease in the size of the lode, and we have reason to think this is so, as there is a good lode both in the 860 south, so far as it is driven, and in the 760 south right up to the boundary; while we know that Rowe's shaft, in the Champion Reef Company's property, is opening up a fine rich lode in the part of their mine which immediately adjoins these workings. I am pleased to inform you that an important improvement has taken place in the lode in Taylor's shaft, for the cablegram informs us that the lode has increased to 4 feet wide, and the quartz in it is worth 19 dwts. of gold to the ton. The 860 north is being driven on a part of the lode, which lies to the side of the lode on which the 860 south from Wallroth's was driven; this level is being continued north besides the old level, and the cablegram says that the lode here is 2 feet wide and worth 1 ounce. This point is of some importance as indicating the existence of two parts of the lode, and will be watched with interest. A winze has been commenced under this level, which is alluded to in the cablegram, the lode here being 1 foot wide, assaying 19 dwts. to the ton. The 860 level south has been driven 166 feet since January, on a lode 1 foot 7 inches in width, worth 1 ounce 12 dwts. The cablegram speaks of the lode here as being 1 foot 6 inches wide, and worth 5 ounces to the ton. The winze under this level is mentioned in the cablegram, the lode being 1 foot, assaying 1 ounce 1 dwt. to the ton. The 760 south has been driven 476 feet during the year, opening up a fine section of ore ground, the lode being 2 feet 2 inches in width, worth 2 ounces 14 dwts. The No. 3 winze under this level is opening up some rich ore; the cablegram says that the lode here is 1 foot 9 inches in width and worth 3 ounces. The 660 has been driven 481 feet during the year on a lode 1 foot 7 inches in width, assaying 1 ounce 16 dwts.; this level has now reached the boundary. The 860 level above again has been driven 285 feet, the lode averaging 2 feet 2 inches in width, and averaging 1 ounce 16 dwts. This again is up to the boundary. From my description of these points, you will see that a great length of good ore ground has been developed in this part of the mine, and the result has been very satisfactory indeed. (Applause.)

The report was adopted, the retiring directors and auditors being re-elected, and the meeting closed with a vote of thanks to the Chairman.

## HARRIETVILLE GOLD MINING COMPANY, LIMITED.

The statutory meeting of the shareholders in the Harrietteville Gold Mining Company (Limited) took place at the company's offices, No. 6, Queen-street-place, E.C., on Wednesday, when the Earl of VERulam presided.

The SECRETARY (Mr. John Garland) read the notice convening the meeting.

The CHAIRMAN said: Gentlemen—We have now arrived at the statutory meeting of this company after its reconstruction, and you will naturally understand that so short a time having elapsed since its inauguration, I shall not have very much news to give you, but I am happy to tell you that such news as I have is of a favourable nature. You will recollect we were incorporated on December 3 last, and I shall be able to give you a few details which, perhaps, you will wish to know. The nominal capital of the company is 150,000 shares, and our own shareholders come after as well that out of the 146,330 shares for which the liquidator was entitled to receive applications no less than 100,045 had been applied for, the subscription of 6d. per share, producing £2513 10s. 6d. This leaves 45,897 shares still unissued, with a credit of 2s. paid, in the hands of the liquidator, and if anybody wishes to take up a further holding in the company he has the opportunity of applying to that gentleman. There is also a balance of shares held in reserve, which will be issued at or above par, of 3663. These are available for the general public, if they wish to pay 4s. per share. The total capital subscribed is £10,045 2s., leaving an uncalled capital at present of £7531 11s. 6d. We are happy to be able to tell you that the trial crushings on the new discovery since October 15, which was previous to our incorporation, have been very satisfactory. On October 15 23 tons produced 60 ounces of gold, giving an average of 2 ounces 20 dwts. 20 grains per ton. On November 11 a crushing of 60 tons produced 106 ounces of gold, or at the rate of 1 ounce 15 dwts. 8 grains per ton, and on November 18 we had a similarly rich crushing, 18 tons yielding 118 ounces gold, or an average of 6 ounces 11 dwts. 2 grains per ton. Then, since the incorporation of the new company, on January 16, we had a further cable stating that 50 tons crushed produced 75 ounces of gold, giving an average of 1 ounce 10 dwts. to the ton. The total gold produced from the 156 tons is 359 ounces, or in gold sovereigns the sum of £1536. The average yield of the aggregate quantity crushed was 2 ounces 6 dwts. to the ton. Well, since that time Mr. Davey has very wisely, knowing that it would be an expensive business to continue sinking and having to haul the stuff up so great a distance, discontinued crushing until he has out the lode at a depth where mining and milling can be carried on with greater facility and at a cheaper rate. In a letter we have received from Mr. Davey he says he is driving towards the shoot. "There is a vast improvement," he continues, and this is an unusual phrase for Mr. Davey to use, "in the lode, and it now reaches 15 dwts. per ton." This refers to the shoot at the 100 feet level on the driving from Tunnel F. I think it is sufficient to mention these figures to show you that we have

been justified in asking you to put your hands in your pockets and help to reconstruct the company. At the present moment we have, by means of this reconstruction and by means of the gold won from this new discovery, been able to pay the whole of the debts, and, not only that, but in consequence we are keeping our capital practically in tact. I trust that the favourable results which we have hitherto achieved will be continued. As I said at the beginning, it is but very little news that I have to give you, but I think you will agree it is most favourable. We look forward to a continuance of the work done by Mr. Davey, who has so ably performed his task in the past, and trust that equally good results would be obtained in the immediate future. In a very short time we hope to hear from him that he has cut the lode in the 300 feet level, and that it may prove as satisfactory as it has been in the 100 feet and the 160 feet levels. I hope, therefore, we may consider the success of this mine is assured for some time to come. I beg to thank you for the kind way in which you have received my remarks; and I will now ask Mr. Edgar Taylor to recapitulate to you particulars of the work which has been done at the mine. (Applause.)

Mr. EDGAR TAYLOR said:—Gentlemen—You will remember that the directors' report, which was issued before the general meeting on November 20 last, mentioned the discovery of a new lode upon your property. This new lode was found to outcrop at surface some 200 feet to the east of the workings in the Harrietteville Mine. It was first discovered by surface trenching. A trench some 50 feet long was excavated to a depth of 4 feet, which exposed a lode 2 feet in width, estimated to assay 2 ounces to the ton. A shaft has been sunk to a total depth on February 14 of 115 feet. At a depth of 20 feet the lode in the shaft was 1 foot 6 inches wide, assaying 1½ ounces. At this depth a level has been driven north some 45 feet, the lode being from 2 feet to 3 feet wide, assaying from 2 ounces to 3 ounces; the lode in the end itself has become small, and we have, perhaps, reached the limit of the shoot of ore in this direction. At 48 feet a level has been driven north some 40 feet, the lode being from 1 foot 6 inches to 2 feet in width, assaying from 1½ ounce to 1½ ounce to the ton. From the 48 feet level down to the next level below the 100 feet level the lode in the shaft has varied in width from 1 foot to 2 feet, worth from ½ ounce to 1 ounce of gold to the ton. The 100 feet level north has been driven 45 feet, the lode here again being from 1 foot to 1 foot 6 inches wide, assaying about ½ ounce. The shaft has been sunk, according to the last report, to a total depth of 115 feet, the lode in the deepest point being 1 foot 6 inches wide, assaying ½ of an ounce. Our superintendent, Mr. Davey, speaks of the shoot extending farther to the south than he has at present been able to explore it. As this newly-discovered lode lies not far east of the workings in the old mine, we are able to attack it in greater depth by crosscuts therefrom; already at Tunnel F a crosscut has been extended, and had actually cut this new lode, but it had not been driven on, nor had it been recognised as valuable at the time those workings were carried on. This tunnel is at a depth of about 160 feet below the point at which the surface discovery I have mentioned was made. We have continued a drive on the lode from the crosscut at Tunnel F, and the lode here has recently opened out, and in the last report is mentioned as being 1 foot in width, assaying ½ ounce to the ton. This level will be rapidly continued, and will, we hope, open up good stoping ground. Tunnel E is 200 feet deeper than Tunnel F, and a crosscut from it has already cut what our superintendent believes to be this same lode. A level from the crosscut is now being continued to come under the pay shoot, and we hope for a good discovery here. We shall be able to explore this lode at still greater depths in Tunnel D. So short a time has elapsed since the first discovery of this new lode was made that comparatively little work has as yet been accomplished on it, but the points which I have mentioned will, I think, show you that a good body of payable ore is being laid open. (Applause.)

Replying to questions asked by SHAREHOLDERS, the CHAIRMAN said the capital of the company was intact, with the exception of about £121. The new company took over all the assets and liabilities of the old company, and the latter have been paid off. The reason why the mine could be worked at such a cheap rate (6 dwts. 12 grains would give a profit) was that water power was used for the driving of the machinery.

The meeting then terminated.

## THE ALMADA AND TIRITO COMPANY, LIMITED.

The second ordinary general meeting of the proprietors of the Almada and Tirito Company (Limited) was held at the offices of the company, No. 6, Queen-street-place, on Tuesday, under the presidency of Mr. SAMUEL J. WILDE.

The SECRETARY (Mr. W. F. Garland) read the notice convening the meeting.

The CHAIRMAN said: Ladies and Gentlemen—I suppose you will take the report as read. As usual, I shall leave the particulars of the mining to our expert, Mr. Frank Taylor, because it is much better to have this information first hand, than to have it filtered through me, but I would just call attention to one or two things in the report. This is a very satisfactory statement to my mind, and I am rather sorry that some of the mining papers have not looked upon it in the same light as I have. I think the report is very gratifying considering the very short time we have been in existence. We have done some very good work, and everything promises to bear out the views of the directors when we first started the new company. We had reason then to believe that the ancient workers were driven out of the mine by water, and, therefore, if we went down below the old workings we thought we should find something worth having. I think, as far as we have gone, our views have been shown to be correct, although we have not had time yet to go down to the depth we intend to. You will see in the report that the company have a very long length along the line of lode—it is 6500 feet, or (say) 1½ miles, and the quality all along is rich. That is a good long stretch of country; and, as regards the works commenced, you will also see in the report the following statement:—"Further south, 435 feet from Wilde's shaft, is Taylor's shaft, which was sunk from surface to a depth of 150 feet." This has been driven north and south, and we go on to say in our report that a very valuable shoot of ore 80 feet long was passed through. It is worth 2 tons per fathom, and 50 ounces of silver per ton. In going further north we pass through, in the direction of Wilde's shaft, comparatively speaking, a poor lode, but still it is mineralised. We telegraphed out to Captain Nute the nature of this meeting, and asked him if anything was worth mentioning, to tell us about this lode. This morning, in consequence, we received this telegram:—"Lode opening up well, north level of Taylor's, 9 feet wide, yields an average of 3 tons per fathom, of (say) 35 to 40 ounces of silver per ton." Therefore, you will see both right and left here we have got some very valuable ore. Coming to the finances, you may remember that we took over the old company at 1s. 9d. per share, amounting to £30,000, but we also took over the assets, and these consisted of stores and other things. You may look upon 1s. 9d. per share as more or less too much, but we believe the property to be very valuable. The stores, machinery, &c., were valued at £3500, and it is very fair to deduct this from the £30,000, thus reducing it to £27,000. The working capital of 9d. per share that is in course of payment amounts to £13,100 in round figures. Add this to the £3500, the value of the stores, that gives us a working capital of £16,600. We have had considerable help from the old mine, having got something like £10,000 worth of ore. Of course that is subject to the cost of raising, but the profit on it will be a very good one, so that of the £31,000 we really still have almost as much cash left as we had to begin with—that is to say, we started with a working capital of £13,000, and of the £31,000 we really have now a working capital of £12,900. By these figures you will see the great assistance we have had from the old mine in the opening up of the new one. Captain Nute, who has done so well for us, is coming home for a holiday. The climate at the mines is not too healthy, and it is necessary for a man to go away for a time. Captain Nute will be absent from the mine five months, and



I am happy to say that he has signed an agreement for 3½ years from January 1 last, so that we shall have his services for a long time to come. I think this is all I have got to say, but, of course, I will answer any question put to me. I will now move the first resolution:—That the report and accounts, dated December 31, 1895, presented to this meeting, be received and adopted."

Mr. H. SWAFFIELD said: I beg to second the resolution, and in doing so I think I may say we can fairly congratulate ourselves on the position of the company, as we find it to-day. We have now done 12 months' work at the mine, and opened up a good deal of ground, showing, it appears to me, prospects which are exceedingly encouraging. It is true that up to a recent period we had not opened up any ore body of importance, but we have proved this—that the lodes are mineralised, and for the most part productive, although up to the present they have not been quite so productive as we could have wished. Any day however, we may get news that a good body of ore has been opened up. It must be borne in mind that the mine is only 150 feet deep at present, a comparatively shallow mine, for it only represents 25 fathoms, and we cannot expect the lodes to be very regular here. But Captain Nute has formed the strong opinion that as we get deeper so the lodes will improve in productiveness and quality. I don't know how he arrives at that opinion, but at all events it is a most encouraging outlook when we consider that the telegram we have received points in the same direction. Our Chairman has pointed out to you the financial position of the company. I take it we have assets to the value of £31,000, less liabilities, which is just the balance on the expenditure of the year, while we find ourselves in possession of a productive and promising mine, which we really obtained for nothing. I think, therefore, that our position and prospects are most encouraging.

Replying to questions asked by SHAREHOLDERS, the CHAIRMAN said the difference between the receipts and the disbursements, £29,358, represented the loss on the opening up of the mine. It was charged against the capital, while in the same way any profit was credited to the capital. About 25 ounces of silver to the ton would pay for working, but he believed in the future this would be reduced.

Mr. FRANK TAYLOR said: Ladies and Gentlemen—It is just 11 months since we last had the pleasure of meeting you and had the opportunity to explain what work had been done since the formation of the company, and also what our programme for the future was. During this period work on the new property has been vigorously carried on, and from what I now have to tell you, I think you must agree with the directors and ourselves that great credit is due to Captain Nute and his staff for the large amount of work they have done in the time, with the small amount of capital that has been expended. The company, as you will recollect, was reconstructed to actively work the new property, which the old company had acquired for practically nothing, but were without funds to work. However, before conducting you over the workings on the new or Guadalupe Mine I will say a few words about the work in the old mine. During the year the level to the north of Dios Padre shaft was driven 220 feet, but with disappointing results, and it has now been stopped for the time. Other exploratory work has been done to develop stopping ground with varying success; however, a good extent was laid open which has been taken away at a profit, and which has assisted the finances of the company. The stopes have varied greatly during the year, but the latest reports are encouraging, stating that they have improved, and are yielding \$1600 to \$2000 weekly. Captain Nute, in his annual report, says that with great difficulty they recently effected an entrance to the San José Mine, and that he expects to get good returns from there. We are still in hopes that the day will come when funds will be available to again work the old mine on a considerable scale.—Guadalupe Mine. At the date of the last meeting work had only recently been commenced, so practically all that I now have to describe has been done since then. The plan and section on the wall show you very clearly the positions of the different workings. You will see that the main lode runs a somewhat irregular course, almost north and south, and that the Europas lode intersects it in the vicinity of Taylor's shaft. The works of the ancients, from which the rich ore was taken by them, are shown, and you will see at a glance how we are going to develop the lodes beneath these surface workings, which no doubt were stopped by the influx of water. I will now deal in detail with the new work being carried on by your company, commencing at the north end of the property. Ibarra tunnel is being driven to the south to prove the ground towards Wilde's shaft, and on February 29 (the date of the last report received by us) it was in 370 feet. The lode, though of a congenial character throughout, and yielding good stones of ore at times, has not discovered any extent of ground that would pay to take away. However, the latest report says that the end yields a little green ore, and looks promising. As this tunnel advances under the ancient workings known as Inglesita, we shall be much disappointed if we do not discover some profitable ground. A communication from this tunnel to the level coming north from Wilde's shaft will be useful for ventilation. Wilde's shaft is 1290 feet south from the tunnel mouth, and was sunk some distance before we became possessors of the mine; it has been cleared out with some difficulty and sunk to a depth of 172 feet, where levels north and south are being driven. This depth corresponds with the 150 feet at Taylor's shaft, which will enable these levels to be communicated. The lode was intersected 165 feet from surface, and is now being continued on the underlay. There is a strong lode in the shaft, but no ore of much value has been developed at present in the short distance it has been sunk since the reef was cut. 150 feet level north driven 142 feet, width from 1 foot to 4 feet, and for a length of 75 feet yielded 2 tons per fathom of 30 ounces ore. The present end is unproductive, but of an encouraging appearance, and an improvement I looked for here, as the level advances under some old surface workings, which, Captain Nute says, undoubtedly yielded some rich ore, perhaps superior to anything found on the property. 150 feet level south driven 130 feet, and will, before long, communicate with the 150 feet level coming north from Taylor's shaft, which will improve the ventilation throughout the mine. It has been driven on a massive lode, carrying some low grade ore, and the latest report tells us it is of an encouraging character. Taylor's shaft is 435 feet south of Wilde's, and was started by the new company; it is situated about 100 feet east of the back of the lode, and when 150 feet deep the lode was intersected by a short crosscut, and levels started north and south. The sinking is now being continued on the underlay, and is now 170 feet deep, going down in a massive lode, worth 2 tons per fathom of 50 ounces ore. A hoisting engine is now being erected on this shaft, which will greatly assist the development of this portion of the mine. 150 feet level north driven 106 feet, and has laid open ore yielding a good average grade, and the latest news says it has improved, yielding in the end 18 tons per fathom of 34 ounces ore, and Captain Nute describes the lode of splendid appearance, and in virgin ground.—Telegram: "Opening up well; 9 feet wide; 3 tons from 35 to 40 ounces." 150 feet level south extended 146 feet for 60 feet from the shaft; it was driven on a very good lode, yielding 2 tons per fathom of 50 ounces ore; it was then poor for a distance, but has again improved. In advance of this drive there are extensive old workings, and we look forward to an improvement being reported from here shortly. Europas lode joins the main lode about 20 feet from the shaft, and a level was driven on it some distance, when it struck 1 to 2 old workings. It has, therefore, been stopped, until this lode can be attacked by deeper levels. Some good ore was broken at the commencement, and we look for favourable results when we go deeper. No 3 shaft is being sunk further to the south, and will eventually communicate with Taylor's. New discovery has recently been on the Europas lode some 2500 feet to the south, and when opened on it is hoped it will prove to be of value. Samples from the branch of ore discovered assayed from 30 to 70 ounces per ton. From the point where this discovery was made a deep tunnel can be driven, which would come in 450 feet below the top of Taylor's shaft. This drive would prove the Europas lode, and at the same time would eventually drain the mine to this depth,

and also be a convenient outlet for the ore. Future programme is to push down Wilde's and Taylor's shafts with great vigour, and if a continuance of the rich ore is maintained in the latter, a valuable shoot of ore will be laid open at this point. This is most encouraging and important, as it is the deepest point in the mine, and as Captain Nute has frequently reported that he looks for better ore in depth, we shall watch these sinkings with great interest. In conclusion, I have pleasure in expressing my satisfaction with the result of the year's operations, which have proved to us that our new lode carries rich ore in places, and that we have very good reason to look for further discoveries that will enable us to achieve the satisfactory results we have hoped for, and have been led to expect, by engineers of great experience. As far as the work has gone I think we have reason to be well satisfied and greatly encouraged to look for still better results during the current year. When I had the honour to address you last, I described this as a very promising undertaking, and I am pleased to be able to say that I retain that opinion more strongly to-day than I did then.

The resolution was then put and carried unanimously. Mr. SWAFFIELD moved the re-election of Mr. S. J. Wilde as a director.

Mr. FRANK TAYLOR seconded the motion, and it was agreed to. The CHAIRMAN proposed the re-election of Mr. J. S. Littlehales as a director.

Mr. BLYTHE seconded the resolution, and it was carried. The auditor—Mr. J. W. Harding—was reappointed, and a vote of thanks to the Chairman and directors terminated the meeting.

## CONSOLIDATED GOLD FIELDS OF SOUTH AFRICA, LIMITED.

An extraordinary general meeting of shareholders in the Consolidated Gold Fields of South Africa (Limited) was held on Tuesday, at the Cannon-street Hotel, under the presidency of Mr. W. M. FARMER, for the purpose of considering an agreement modifying the present arrangement between the company and the managing directors.

The SECRETARY (Mr. J. Prinsep) read the notice convening the meeting.

The CHAIRMAN said: Ladies and Gentlemen—It has fallen to my lot, through the absence of your Chairman, Mr. Thomas Rudd, who is on the Continent, and the illness of your deputy-Chairman, Mr. H. E. M. Davies, which I feel sure you will all deplore, to preside; and, personally, I have pleasure in being in the position, and in placing before you resolutions which, when passed, will considerably enhance the already assured position of the Consolidated Gold Fields of South Africa (Limited). Before making any remarks on the matter, I will call on the company's solicitor, Mr. Stewart, to read the agreement, which will enable you to follow the terms.

The agreement having been read,

The CHAIRMAN, continuing, said: We'll, you have heard the agreement read, and I think at the conclusion of the meeting you will give a unanimous vote for its adoption. This should prove an acceptable meeting to you, because it is from your side of the table that comments have been made, time after time, in regard to the managing director's agreement with the company. For our part, on this side of the table, we made the original bargain with the managing directors, which was the best we could then secure, and we were content to see the managing directors making large profits, because the larger the profits accruing to them the greater the profits coming to the shareholders. The accounts to June 30, 1895, as disclosed at the last general meeting, however, show such large realised, and such still larger unrealised, profits that, coupled with the power of the managing directors to give three months' notice to retire and be paid out, they caused us to reflect what would be the position of the company if called upon to pay out an immense sum of money, and at the same time to lose the services of the management which has been so successful in the past. Your directors, consequently, approached Mr. C. Rudd, who was then in England, and subsequently Mr. Cecil Rhodes, and these gentlemen met us in the spirit we should expect of them. Our desire, if possible, was to change the position of the managing directors from that of creditors to partners, by inducing them to accept shares in the company in lieu of their cash claims, and at the same time to provide for their presence in the councils of the company for a lengthened period. They being creditors for so large a sum as would become payable to them in the event of retirement, the finances of the company were seriously hampered; besides which it gave the managing directors a hold over the company which your directors deem undesirable for any gentlemen, however responsible, to possess. To cut a long story short, the advantages of settling on the lines indicated in the circular were so obvious that as soon as the managing directors had agreed in principle, a committee was formed, consisting of Mr. Hamilton, Mr. Leigh Hoskyns, and myself, assisted by Mr. Nison (representing the largest shareholder in the company), Mr. Bishop (of Messrs. Turquand, Youngs, and Co.), Mr. Stewart, and Mr. Hawkesley (our legal adviser). As a result, after deliberation of the committee's report by the full board, the agreement which has been read was drawn up and accepted by the managing directors, subject to your approval to-day. Before, however, convening this meeting, your directors took the further precaution of consulting and obtaining the approval of the leading shareholders of the company. It was, of course, impossible to see all in the short space of time, but I think shareholders were interviewed representing over 170,000 shares. Since then we have received approval from shareholders representing close upon 200,000 shares. Your directors have, therefore, the greatest confidence in recommending the agreement for your acceptance. I would, however, point out that the shares which we proposed to give the managing directors are not by way of goodwill, but for value due to them on retirement, and the longer this settlement is delayed the heavier, in the opinion of your board, will be the payment which will have to be made. It has been argued that, by allotting the managing directors 100,000 shares, they will be getting in perpetuity the same share in profits as they got now under the terminable agreement, but this is hardly so, because the fact remains that you will have to pay them out some day, and whether you sell an issue of shares on the market and pay the managing directors in the cash, to which they are entitled, or whether you give them the shares in lieu of cash, is immaterial, as far as the company is concerned. If they were paid out in cash no one could contend that they were still getting 2-15ths of the net profits. The position is, therefore, the same in giving them shares because, as I have said, the shares are not for goodwill but value. The agreement you will find is, perhaps, better than appears by the circular, because the managing directors re-transfer to the company £123,291 9s. 4d. of the cash actually to their credit on account of the year 1894-5, and the new shareholders will not participate in the 10s. interim dividend, which your directors will in due course declare upon the existing shares. (Applause.) I should also mention that my colleague, Mr. H. E. M. Davies, who represents and holds the powers of attorney of the managing directors in London, also participates in the 100,000 shares, and also gives his active services to the company for at least the same period as Messrs. Rhodes and Rudd, and I think I know Mr. Davies well enough to say that, whether he took his remuneration by annual payments, as in the past, or shares with the managing directors in the present settlement, he will have the interest of the company equally at heart, and give us the best of his services, as he has done in the past. (Applause.) Before concluding, I must say a word in regard to the position of the preference shareholders in respect of the proposed agreement. Their position is infinitely improved. In the first place, by reason of the managing directors being converted from creditors into ordinary shareholders, their security is increased. Then, as the managing directors' agreement stands now, the managing directors rank for their 2-15ths of the net profits before the preference shareholders get their 6 per cent, which priority would disappear under the scheme before you; the position of the preference shareholders is, therefore, improved both in

regard to capital and security of interest. Ladies and Gentlemen—During the years we have had the honour of representing you it has been our duty from time to time to recommend you (1) increase of capital; (2) creation of preference shares and debentures; (3) conversion of founders' shares into ordinary shares. These various recommendations, at the time they were brought forward, were met with a certain amount of criticism, but on each occasion you showed your confidence in your board by accepting our recommendation, and, as a result, you find the company in the splendid position which it holds to-day. (Applause.) I feel more confident, therefore, in asking your unanimous approval of the resolution to be submitted to you. I may mention that most criticism was expended on the conversion of the founders' shares then held by the present managing directors. By this conversion your directors effected a cash saving to the company in 1893-4 of £60,000, and in 1894-5 of £447,600, or in two years of £507,600, which once belonged to the founders' shares, which to-day would represent an enormous sum if you had to pay it. The fact of the managing directors consenting to have their shares locked up for four years is a convincing proof of their faith in the future of the company. To return, I should like the resolutions to be passed unanimously, because I think the managing directors have met us well in accepting what we have settled as being fair, and I feel confident that under the new arrangement the efficiency of administration of the company, so far from suffering, will actually be improved. I now beg to move:—"That the conditional agreement between the company and the managing directors, submitted to this meeting, be and is hereby approved."

Mr. HAMILTON: Ladies and Gentlemen—In seconding the resolution which Mr. Farmer has proposed, there is no necessity for me to detain you by any remarks of my own. I think, however, that as a member of the committee which we appointed to thresh out this conditional agreement, I ought to take this opportunity of assuring you that in all our deliberations, which were lengthy, and in all our labours, which were arduous, our sole object was, while fully appreciating the eminent services rendered to this company by Messrs. Rudd and Rhodes, to secure the very best terms possible for the shareholders, preference and ordinary. (Applause.) I desire to emphasise the remarks which Mr. Farmer has made to the effect that this agreement will be a distinct gain to the preference shareholders. I have seen for months past—ever since we emerged from what Mr. Davies would call the humdrum stage of 10 per cent. or 15 per cent. dividends—ever since then I have been haunted by a vision of what the settlement with the managing directors on a cash basis might be, and it is because I have a sincere conviction that this just and equitable agreement will lay that spectre that I cordially and heartily recommend it for your approval. (Applause.)

Mr. BOYCE asked what would happen in the event of the death of one of the managing directors, whose services under the agreement were secured for four years.

Mr. CARTER enquired whether there would be any objection on the part of the directors to state the data whereby it had been determined that 100,000 shares would be a fair equivalent for that which the managing directors surrendered.

Mr. HAMILTON asked whether the directors realised that at the present market value of the company's shares the 100,000 shares would represent a capital of £1,800,000.

Mr. PEARSON enquired whether the old agreement would correspond with the present agreement as regarded the value of the shares now held in the name of the managing directors.

A SHAREHOLDER desired to know whether the managing directors would continue their services to the company, and, if so, for how long.

Another SHAREHOLDER asked the amount of remuneration the managing director received last year.

The CHAIRMAN said that several questions had been asked which he would answer, but he would call upon Mr. Hawkesley to explain the legal aspect of the case in the event of the death of one of the directors. He might, however, state that the directors' view of the matter was that there would be no alteration in the position of the shares for four years. These were locked up, and the executors would stand in the same position as the owners, but the executors would not become managing directors. The shares would not be dealt in for four years—until June 30, 1899. As to the data upon which they fixed the amount at 100,000 shares, the directors had long discussions about the matter. It was not a very easy matter to value the whole of the assets of the company, but they valued them the best way they could. They got the advice of some of the leading stockbrokers in the City, and they took off a very large and liberal discount. He might say, speaking for himself, that if the managing directors had got their payment in money, they would have had a very much larger amount than had been mentioned as the present market value of the 100,000 shares. (Applause.) He was not speaking so much for the board, but rather from his own investigation of the matter, and what he had laid before him as to the assets of the company, and as to their probable value, he did not think that any of the shareholders present would be in a position to say what the future of this company was going to be; but it was going to be something immense. (Applause.) Mr. Hawkesley would reply fully as to the position of the managing directors under the agreement. As to the old agreement he did not think it was necessary to explain its conditions because it was dead. With regard to the amount received by the managing directors last year, it was £333,000, and their agreement was for four years. After Mr. Hawkesley has addressed you I will ask Mr. Bishop to give us his opinion with regard to the 100,000 shares.

Mr. HAWKESLEY stated that his position there to-day was as the representative of Messrs. Rudd and Rhodes, the managing directors, and as there had been so little discussion upon the merits of this agreement, it would not be necessary for him to trouble them at any length. He was quite prepared to say what was necessary to show that the managing directors—as Mr. Farmer had stated, had accepted the agreement in the interests of the shareholders, and from a desire to come to a very liberal settlement. It was competent for the managing directors on the termination of their agreement, which might be terminated by three months' notice only, to call upon the company to give them in cash the value of 2-15ths of their surplus assets—that was to say, the net profits as ascertained by a valuation to be made at the expiration of the three months. He was not, of course, an expert valuer, but there could be no doubt in the mind of any shareholder who had read the reports that had been issued at the expiration of their financial year, who had read the interim reports that has been delivered to the shareholders, and who had further either heard or read the very interesting speeches which were made from year to year by Mr. Charles Rudd—that the company's assets were very valuable. The figures that they were dealing with, of course, were very large, but everything was a matter of degree. They were dealing with a company whose assets were of immense value. Mr. Charles Rudd had demonstrated that as recently as last November. Paving the way, point out what the position of the managing directors was, Mr. Hawkesley said that Messrs. Rudd and Rhodes were the founders of the company. When the company was formed under the name of the Gold Fields of South Africa (Limited) it was a company of small beginnings, with a capital of £250,000, and Mr. Rudd and Mr. Rhodes were entitled to 3 15ths of the net earnings of that company. They took 2-15ths as managing directors, and 1-15th as holders of the founders' shares. The founders' interests were got rid of when the company was reconstructed under the title of the Consolidated Gold Fields, and they were now asked to get rid of their claim to the 2 15ths which they had had since its origin and foundation of the company. That was not the property which they acquired under the reconstruction of 1892, but it was the 2-15ths which they had from the commencement of the company. The two gentlemen in question would cease to be managing directors from the time the agreement was binding, but if they ceased to be managing directors by the agreement being determined on three months' notice here referred to, they would then be entitled to what was more than the equivalent of what the company was now offering them—that was to say, they would be entitled to the equivalent of 2-15ths in cash of the net profits, which, as was



now proposed, they would take away in shares. Therefore, he did not see that the position of the managing directors was one which it was necessary for them to hold to take these annual profits. The claim which they held was for a share of their profits, or the cash equivalent. If they paid them the cash equivalent they would take away a sum of money which Mr. Farmer had told them would be considerably more than £1,300,000, which they would be at liberty to invest in Consols for all time. They were asking the managing directors to accept 100,000 shares in their company, and to retain those shares for a period of four years, during which time they were asked to remain as directors, not as managing directors. He wanted to emphasise the distinction. They were only to remain as directors during a period of four years. One gentleman had desired to know how the services were to be continued, or what would happen if the managing directors died. In that event nothing would happen except that the company would lose their services. Mr. Charles Rudd had often said what a burden he felt the position of managing director to be, and how anxious he was to be relieved of it. Now he was relieved from that position, but he had engaged to remain as a director, giving the benefit of his services during the next four years, and Mr. Cecil Rhodes would do the same. But their position as directors had nothing to do with the payment the company were now making to them. He especially wanted to make that perfectly clear, because it had been one of the elements present in Mr. Charles Rudd's mind when he agreed to accept what was less than he was entitled to. They would remember from the previous report and speeches made in that room that Mr. Charles Rudd and Mr. Rhodes carried with them, and had remunerated out of their receipts, Mr. Davies, who was their representative in London, and Captain Ernest Rhodes, who was the representative of the managing directors in Johannesburg. The remuneration of these two gentlemen would be discharged by the managing directors, and would not fall on the company. He hoped he had made it clear to the shareholders that the agreement had been entered into at the instance of the board and in the interests of the company. (Applause.)

A SHAREHOLDER, who said he represented the company in regard to the negotiations which had terminated the agreement, said that he had carefully followed Mr. Hawkesley's statement, and had not one word of correction to offer as to its terms.

Mr. BISHOP said he had put down a few figures just to show the effect of the new agreement, as compared with the old one. Under the old agreement, as they were aware, the managing directors were entitled to 2-15ths of the whole profits. But now, under the new arrangement they would get a slightly higher fraction—100-725ths of the profits, after deducting £75,000 for the preference dividend. Supposing the profits in the future were £2,250,000—they were £2,250,000 last year—the 2-15ths would amount to exactly £300,000. Deducting from that £2,250,000—£75,000 for the preference dividend—that would leave the shareholders £1,175,000. The proportion they would now get as shareholders was such that unless the profits in future were more than this £2,250,000 in the year, the managing directors would possibly lose. For instance, supposing the profits were only £75,000, the preference shareholders would take it all. The consequence was that unless the profits got beyond £2,250,000, there would be no advantage in the alteration of the percentage of the managing directors. There was another point about it—the managing directors had now to their credit as undivided profits the sum of £220,000, and there was a proportionate sum to the credit of the shareholders as undivided profits. Now it was proposed that the shareholders should get out of their share a dividend of 10s. per share—at the rate of 100 per cent. per annum for the half-year. That would entitle the managing directors to something like £50,000 out of their sum of £220,000. Instead of that, they were to take nothing out, but there was to be a transfer from the amount standing to their credit to the capital account, which was virtually subscribed and paid in cash. It was a sum standing to their credit and it went into the funds of the company, against which the shareholders had their 13-15ths, so that the managing directors were giving up, if they got £312,000, a half-viz., £628,000. If they got that they would be entitled to £50,000 in cash. That meant they did not get all the undivided profits of £325,000 as it was taken out and merged into the general fund. The 100,000 shares was arrived at not from taking the value of the assets, because that would be almost impossible, but it gave them as shareholders and not as creditors of the company as near as possible the same proportion of profits in the future as they had had in the past, and that was a perfectly fair arrangement. If the profits came down to £75,000 the managing directors got nothing, and, therefore, unless they were very large, as they anticipated would be the case, they would get nothing. They had consented to lock up their shares for a period, because they considered they would be worth a good deal more in future. They did not object to locking them up, because they did not want to get rid of them. They preferred taking their 2-15ths, getting the dividends on the shares, to taking their 2-15ths according to the old arrangement, and they were quite content to hold them, believing it would be for their benefit as well as the company's. (Applause.)

The motion was then put and carried unanimously. On the motion of the CHAIRMAN, seconded by Mr. HOSKINS, the following resolution was also carried:—"That the capital of the company be increased to £1,975,000, by the creation and issue of 100,000 new shares at £1 each, to be called ordinary shares, and to rank *pari passu* with the existing 625,000 ordinary shares in the capital of the company."

A vote of thanks to the Chairman, on the motion of Mr. FARQUHARSON, closed the proceedings.

#### PALMAREJO MINING COMPANY (LIMITED).

An ordinary general meeting of shareholders in the Palmarejo Mining Company (Limited) was held on Monday, at the company's offices, 32, Old Jewry, the chair being occupied by Mr. T. Southcott. The secretary (Mr. R. J. Scriven) read the notice convening the meeting. The Chairman said: Gentlemen—In the absence of accounts your board feel that they cannot ask you to transact any of the business of the company. One thing so much depends on the other—that is, the report so much depends so much upon the accounts and the accounts upon the reports—that I think you will agree with me as to the policy of an adjournment. The accounts which have been received within the last week from the mine require a great deal of explanation, and we shall have to refer questions out to our accountant in Mexico, so that it will take us some little time to get answers back. In addition to that, I think you will see from the brief report we have read to you that you would be in a better position to discuss the situation of the company when the new works we contemplate making are further advanced. Holding these views as we do, we suggest to you that we take an adjournment for some months, when we shall be in a position to discuss to you not only the accounts but also the position of the mine as well.—The meeting was then formally adjourned *sine die*.

#### KANYA EXPLORATION COMPANY (LIMITED).

An extraordinary general meeting of the shareholders in the Kanya Exploration Company (Limited) was held on Monday, at Winchester House, E.C., for the purpose of receiving the report of the committee, authorised at the ordinary general meeting of March 13, to confer with the directors as to the advisability of amalgamating the mineral concession of the company with that of the Bangwaketsie Concession Company (Limited).—Mr. L. R. C. Boyle presided.—Major Dugdale, chairman of the committee, stated that the concession gave the company the right to take possession of 400 square miles in the Bangwaketsie country, which comprised an area of 17,000 square miles. But the company with which they proposed to amalgamate had similar rights, and he might point out that many advantages would be derived by adopting the suggestion. Instead of having two prospecting parties working against each other, they would have one working for their common interests, while the area over which they had the right to prospect would be doubled. In addition, by the terms of the agreement, each company would

pay £5000 in cash and buy of each other 5000 shares, thus making the working capital twice as large as it would otherwise be. The committee also recommended that Sir Robert P. Edgecombe and Mr. C. A. Whitfield should be appointed directors, and that an "advisory" committee should be selected to confer with the directors whenever it was deemed desirable.—A short discussion ensued, after which the Chairman proposed:—"That the agreement dated Feb. 17, 1896, entered into between this company of the one part, and the Bangwaketsie Concession Company (Limited) of the other part, be and the same is hereby ratified and confirmed."—Mr. J. B. Poole seconded the motion, and it was agreed to *nem. con.*—Major Dugdale moved the appointment of Sir Robert Edgecombe and Mr. C. A. Whitfield as directors.—Mr. J. B. Poole seconded the resolution, which was carried.—The proceedings then terminated.

#### LISBON-BERLYN COMPANY (LIMITED).

The adjourned third ordinary general meeting of the Lisbon-Berlyn Company (Limited) was held on Tuesday, at the Cannon-street Hotel, Mr. Nicol Brown presiding.—The Chairman, in moving the adoption of the report, stated that since the issue of the previous balance-sheet 210,000 shares were sold by the old board, the net profit or premium on that sale being £6375, which had been placed to a separate account. The development, general expenditure, and revenue account showed an increased debit balance of £6039 for a period of 18 months; but the accounts only covered some five months of the new administration, so that that increase could not in justice be attributed to the present board. The development of the mines and the output of ore was going on steadily, and the dry crushing was still giving favourable results. The directors thought the company had now turned the corner, and that their 8 dwts. ore would yield a profit; but in order to do this they would require to work a very large quantity of it. Of course, any increase in the assay value of the ore would be so much to the good. Everything had been done in the way of increasing the development of ore in sight at the mine, and as soon as this development was extended they would again increase the cyanide plant. The diamond drill had been shipped, and was expected to arrive at the fields about the end of April. Having referred to the value to the company of the great Lisbon-Berlyn waterfall, the Chairman mentioned that the manager proposed to start boring in the neighbourhood of the Berlyn mill reef. The latest advices stated that the shaft on that reef was now down 16 feet from the bottom of open cut on the hanging wall of the reef. In conclusion, the Chairman stated that there was no intention whatever at the present moment of suggesting amalgamation with any other company.—The report was unanimously adopted.

#### DON PEDRO GOLD MINING COMPANY (LIMITED).

An extraordinary general meeting of the shareholders in the Don Pedro Gold Mining Company (Limited) took place at Winchester House, E.C., on Monday, for the purpose of confirming the resolutions passed at the meeting on March 12, reconstructing the company, and registering a new one, to be called the Santa Anna Gold Mining Company.—Sir F. D. Dixon Hartland, M.P. (Chairman of the company) formally moved the necessary resolutions, which were unanimously agreed to.—Mr. Jacobs proposed that the remuneration of the liquidators (Sir F. D. Dixon Hartland, Mr. A. J. Arkey, and Mr. H. Tolpitt) should be fixed at £200, such sum to cover the remuneration of the same gentlemen who acted in the last liquidation, and for which no provision was then made.—Mr. Pullen seconded the motion, and it was agreed to.—The Chairman announced that that morning the directors received the returns for the past month, from which it appeared that the gold extracted amounted to something like £1000.—Mr. Pullen moved a vote of thanks to the directors of the old company.—A Shareholder seconded the resolution, which was carried by acclamation.—The Chairman, in reply, said he was sorry that the Don Pedro Company had not turned out so successful as they had expected it would, but he hoped that the new company would be very prosperous.—This concluded the meeting.

#### THE BANK OF AFRICA (LIMITED).

The twenty-ninth ordinary general meeting of the shareholders in the Bank of Africa (Limited) was held at the Cannon-street Hotel on Wednesday, Mr. John Young presiding.—The Chairman, in moving the adoption of the report and accounts, and the declaration of a dividend at the rate of 10 per cent. per annum, together with a bonus at the rate of 2 per cent. per annum, stated that the increase in the capital of the bank had greatly strengthened their position in the commercial world. Of the 44,000 shares offered to the shareholders 30,275 were taken up, the premium realised by the issue being £127,137. This had been added to the reserve fund, which, with the addition of £10,362, a part of the profits, now amounted to £287,500. The subscription of the new capital, together with the considerable increase in the number of deposits, was good evidence of the confidence placed in the bank. With regard to the investments there was an increase in the Government securities, and a falling off in discounts and loans. Although they were not quite unprepared for it they had suffered to some small extent from the great depreciation which took place at the end of last year in the gold mining properties in the Rand, but nevertheless their net profit of £27,265 only showed a decrease of £790 as compared with the previous half-year. Of the £33,883 they had to deal with, it was proposed that £15,373 should be paid away in dividends, £1000 contributed to the pension fund, and £7146 would be carried forward. As to the future, he mentioned that the output at the Rand gold fields was increasing, while with regard to the present disturbance in the territories of the Chartered Company, although it would prevent the transaction of business for the present, he thought they had no cause for anxiety as to the safety of their property.—Mr. Barsdorf seconded the resolution, and it was carried unanimously. The retiring directors, Mr. Rochfort Maguire and Mr. William Young, were both reappointed, as also were the auditors, Messrs. Deloitte, Dever, Griffiths, and Co.—The Chairman next moved that the directors' fees be increased from £2000 to £3000 per annum.—Mr. Blaine seconded the motion, and it was agreed to.—A vote of thanks to the Chairman, directors, and officials concluded the meeting.

#### PHOSPHOR BRONZE COMPANY (LIMITED).

The annual general meeting of shareholders in the Phosphor Bronze Company (Limited) was held on Friday last week at the Bridge House Hotel.—The report presented briefly summed up the results of the past year's working in the following paragraphs:—"The net trading profit amounts to £2097 Os. 2d., which after provision is made for debenture interest, all fixed charges, the extraordinary legal expenses in connection with the alteration of capital and Memorandum of Association, depreciation of property, and bad debt, leaves a balance of £93 10s. 5d., which it is recommended should be applied to forming a nucleus for a sinking fund for the redemption of debentures and the premium thereon. The company still hold the 100 shares of the nominal value of £300, the proceeds of which when sold will go the credit of profit and loss in part recovery of the loss sustained through the Birmingham frauds. The depression in trade during the first half of 1895 was even more marked than in 1894, but in the second half a very great improvement took place. This has since been fully maintained. Notwithstanding the increasing severity of competition, the directors have good reasons for anticipating a career of renewed prosperity for the company, and now that most of the material obstacles to its progress have been removed, they fully believe that the company will soon be in a position to resume the payment of dividends."—The report and accounts were adopted.—Mr. F. W. C. Cumming having been re-elected, and Mr. R. Payne, F.C.A., reappointed auditor, the proceedings terminated.

#### TASMANIA CROWN SILVER MINING COMPANY (LIMITED).

The annual general meeting of the proprietors of the Tasmania Crown Silver Mining Company (Limited) took place at Winchester House, E.C., on Tuesday.—Mr. G. H. Hargreaves, who presided, in moving the adoption of the report, stated that the operations of the company were now concentrated upon Section 736, which offered excellent prospects, judging from the result not only of the developments so far as they had proceeded, but also from the working of neighbouring mines. Having ascertained that the ore on Section 199 was not present in sufficient quantities to pay expenses, they proposed to remove all pumping and hauling machinery to Section 736, and to sink a main shaft there. By this means the section would be extensively developed.—Mr. Lander seconded the motion.—Mr. G. R. Tilly (the company's manager) next described the nature of the developments it was proposed to carry out at the mine in the future. From the ore which is being produced at neighbouring mines he was of opinion that the ore they would find below the 80 feet level would be of a very remunerative character. With regard to water, he had no doubt that they would easily overcome this difficulty, seeing that their neighbours were draining it away from them, while, in addition, their machinery would be ample to contend with such a matter. In conclusion Mr. Tilly said he felt quite sanguine and confident that they would get good returns from the mine.—Mr. D. C. Griffiths, who recently visited the mine, also addressed the meeting. Even though, he said, the mine might not be going on satisfactory for a time, they should never give it up, as he was convinced from the experience obtained on other properties that good ground still remains to be discovered.—The motion was agreed to, and a vote of thanks to the Chairman terminated the proceedings.

#### THISTLE REEF GOLD MINING COMPANY (LIMITED).

An extraordinary general meeting of the shareholders in the Thistle Reef Gold Mining Company (Limited) was held at the Cannon-street Hotel, on Thursday, Mr. B. Hallett presiding, for the purpose of confirming the resolutions passed at the meeting on March 16, for the reconstruction of the company.—The Chairman formally moved the confirmation of the resolutions.—Mr. E. J. Reade seconded the resolutions.—Some discussion took place in consequence of the further information promised at the last meeting not having been given by the Chairman, and complaint was also made that the names of the two shareholders proposed to be elected to sit on the board were not disclosed.—Mr. Staydink moved as an amendment that the meeting be adjourned for a month to enable the directors to verify the reports they had received in regard to the new property.—A Shareholder seconded the amendment.—The Chairman, in reply to the discussion, said the directors had no further information to impart to the shareholders beyond what was told them at the previous meeting. In reference to the two new directors, Mr. Walter Tidd had been asked to sit on the board, and had consented, and he now invited further nominations.—Mr. Heiron was nominated, and he said he would inform the board after Easter whether he would accept the seat offered him.—The amendment, on being put, was lost, and the resolutions were then carried by a large majority.—A vote of thanks to the Chairman concluded the meeting.

#### TRANSVAAL GOLD EXPLORATION AND LAND COMPANY (LIMITED).

An extraordinary general meeting of shareholders in the Transvaal Gold Exploration and Land Company (Limited) was held at the Cannon-street Hotel on Tuesday last, under the chairmanship of Mr. Nicol Brown, when the following resolution, which was passed at the extraordinary general meeting held in March, voluntarily winding up the company, was unanimously confirmed. On the motion of the Chairman, the following resolution was carried:—"That Mr. Charles Leo Nichols, F.C.A., the liquidator appointed for the purposes of the winding up of the company, be paid for his services as such liquidator the sum of 250 guineas, clear of all disbursements."

#### NEW ZEALAND CROWN MINES COMPANY (LIMITED).

The first annual general meeting of the New Zealand Crown Mines Company (Limited) was held on Wednesday, in the Accountants' Hall, Glasgow.—Mr. John Wilson, M.P. for Govan, presided.—The report of the directors and the statement of accounts, which have already been published, were taken as read.—The Chairman, in moving the adoption of the report and statement of accounts, said that the directors were pleased to be able to recommend a dividend of 1s. per share on shares of 17s. paid up, being at the rate of about 6 per cent. on paid-up capital of the shares. The gross profits had amounted to about 10 per cent. on the paid-up capital, but the directors had deemed it advisable to make what appeared to them fair and reasonable provision for depreciation and redemption of capital, and also to write off one-third of the reconstruction expenses. After doing so, and providing for payment of the dividend, there remained a small balance to be carried forward to next year. After giving details of operations at the mine, the Chairman said that when the new plant was completed about the end of April or beginning of May the present output of the battery would be doubled, and the directors anticipated a substantial increase in profits. With regard to the reconstruction expenses, amounting to £764, the Chairman remarked that this sum might appear large, but he desired to mention that it included £450 of stamp duties paid in this country and in New Zealand on the registration of the new company, and on the transfer of the properties from the old company to the new. In connection with the balance-sheet, he might also say that their funds were in a satisfactory condition, and unless something exceptional occurred the directors thought a call would not be required for at least some time to come.—Mr. W. A. Arrol seconded.—Replying to a question by a Shareholder, the Chairman said that so far as they saw at the present moment they had sufficient money to meet the expenditure on plant on the new mine. Unless some exceptional difficulty came in the way the probability was that they would not require to make a call. The water in the underground workings was a contingency they had foreseen. There was good solid rock in the bed of the river, where the reef was, and so far as they had gone the quantity of water was not so great as might have been expected in the circumstances. There was comparatively little water considering that they were so near the river. With regard to amalgamation with the Earl of Glasgow property, negotiations were still in progress.—The report was adopted.—Messrs. Dunnachie and Gilchrist were re-elected directors; and Messrs. Walker and Marwick were reappointed auditors.—This was all the business.

A NEW RUBY MINE TRACT.—Large numbers of licenses have been taken out by Shans and Burmese for working a ruby tract at Nanyaseik, and it is expected that the revenue for the present official year will amount to Rs. 15,000. It seems that the tract, which was thought to be newly discovered, was worked in the distant past.

THE offices of the *Bullionist* and Walker and Co., General Advertising Agents, are removed from 27, Throgmorton-street to more commodious premises at 54, Old Broad-street, E.C.



## PARIS LETTER.

(FROM OUR OWN CORRESPONDENT.)

**The set-back in Kaffirs.—Position of leading shares.—A French engineer's impression of the Rand.—The new gold mining regulations in Madagascar.—The Suberbieville Gold Mining Company.**

THE confidence of investors in South African mining scrip is being perceptibly weakened by the political and other troubles which hang over the Kaffir market. Holders of shares have for a long while past refused to allow themselves to be influenced by political questions in their selection of mining scrip, as they urged that, however much the Rand industry might suffer for the moment from an arbitrary interference with operations, the fact remained that the known existence of practically unlimited supplies of gold was a sufficient guarantee of the dividend-paying value of their shares. Investors had, therefore, made up their minds to hold on until the outlook became more reassuring, when it might be reasonably expected that the resumption of operations upon a more extensive scale would compensate them for a temporary loss of profit. At the same time, it has become evident to them that English speculators were doing their best to depress the foreign exchanges, in order to bring about a transference of scrip from the Continent to London; and this belief naturally strengthened the French investor in his determination not to be led away by the weakness of the Stock Exchange. It has been a constant struggle between the French shareholder and the English speculator; and the persistency with which the latter continues to bear the market is producing the desired effect. Whether or not the English are carrying out the policy which the French credit them with, it is certain that the Paris Bourse is lying under a cloud, from which there does not seem for the moment to be an immediate prospect of escape. It must be admitted, however, that investors are not giving way to anything like a panic. If they did the slump would assume unexpected proportions, for an enormous amount of South African scrip is held by French investors, and if this were thrown upon the market there would infallibly be a repetition of the crisis of last year. Happily, by far the majority of holders see that it is to their interest to keep the shares under lock and key during the present unsatisfactory state of mining finance, and they are only the timid holders who are hastening to realise under the impression that the downward course must continue for some time to come. They are seriously influenced not only by the persistent selling of London holders during the past fortnight, but also by the uncertainty of the political outlook, which they fear will result in further complications in the Transvaal. Again, the interruption to business during the Easter holidays must be looked upon as an incident in the quieter tone of the market, and this, as well as the other features, is merely of a temporary character. It may be reasonably expected that when the holidays are over the market will once more undergo a recovery, though probably not sufficient to entirely compensate for the drop that has taken place during the past two weeks.

As the week closes a rather better tone is noticeable in some of the leading Kaffir shares owing to the purchases that were made on Thursday on London account. Those who had been prophesying a continuous decline in South African mining scrip are now ready to admit that the outlook is more reassuring, though it is still far from being altogether satisfactory. In most of the leading securities there is again a drop of a few points, but an advance which has taken place in a favoured few has served to improve the position of the market generally. Consolidated Gold Fields, which had sustained a heavy drop through the off-loading of this scrip from London to Paris, have recovered slightly, and Robinson Banks have also improved a few francs during the past two or three days. Simmer and Jacks have in the same time been quoted up to 10 francs. Still, all these values are much lower than they were a fortnight ago. On Thursday the quotations of the principle shares dealt in were:—De Beers, 697 francs; Buffelsdoorn, 92 francs; Chartereds, 101 francs; East Rands, 158 francs; Ferreira's, 463 francs; Gold Fields, 310 francs; Kleinfontein, 92 francs; Randfontein, 74 francs; Robinson Mines, 237 francs; Robinson Banks, 163 francs; Shebas, 51 francs; Simmer and Jacks, 530 francs; and Transvaal Consolidated, 47 francs.

A further valuable contribution to the knowledge of the auriferous deposits of the Transvaal has been made by M. de Launay before the Société de Géographie de Paris. M. de Launay is professor of the Ecole Supérieure des Mines, and consulting engineer to the Banque Française de l'Afrique du Sud. In this latter capacity he lately visited the Transvaal with a view of studying the auriferous formation of the Rand, Heidelberg, and Klerksdorp, and his impressions fully bear out the favourable reports of experts upon the value of these districts. One point that is worth bearing in mind in estimating the prospects of new companies from isolated crushings is the statement of M. de Launay that the yield of gold varies to such an extent that the crushing of a ton of ore taken from two points on the banket formation, within proximity to each other, will give entirely different results, one yielding probably 2 grammes and another 100 grammes a ton. Consequently, the analyses made from preliminary crushings are not always a trustworthy test of the probable success or otherwise of a new company. M. de Launay expresses the greatest admiration of the way in which the Rand industry is carried out, but he thinks that something has yet to be done, both in improving the treatment of the slimes and in lessening the cost of railway transport and cheapening coal, dynamite, and other material used in the industry. He was particularly struck with the injustice under which the mining companies labour in this latter respect, and says that a reform in the monopolies must be carried out before the industry is able to attain to its greatest development.

The decision of the French Government to cancel the mining concessions granted to English prospectors in Madagascar, and make them over to French concerns, has given rise to a certain amount of criticism in this country, for it is considered that, apart from any question of international right, the policy of driving foreign capital out of the French possessions must have disastrous results. It is pointed out that the Transvaal has attained to its present position of marvellous prosperity solely by the aid of foreign capital and enterprise, and there is no reason why similar results should not be secured in Madagascar. That there is a very wide field for the employment of capital in developing the mineral resources of that island seems to be unquestionable, but, so far, no attempt has been made to turn the auriferous wealth of the country to account beyond what is being done by the Suberbieville Gold Mining Company. This concern is taking very active steps in order to carry out operations upon an extensive scale, and already 400 hands are engaged in laying down the plant, which is intended to relieve the company from the trouble of recruiting native labour. The placer deposits are to be treated by the Californian method, and for this purpose 3000 metres of steel pipes of 40

centimetres diameter are now on their way to the mines. Four powerful excavators, with mechanical washing plant, are also to be laid down, and will be capable of treating 1000 cubic metres a day. The methods of transport are also being improved, and the old 60 centimetre gauge line is being replaced with one of a metre gauge, and orders have already been given out for the material, comprising 30 kilometres of rails, five locomotives, and 200 wagons. Until the installation is completed, the work of gold extraction is being pursued upon a small scale by manual labour, and it is believed that the new deposits now being discovered will be exploited very shortly.

## A STUDY OF SOME ORE DEPOSITS.\*

By F. D. JOHNSON.

"Be it simple or compound, small or large, a crystal or a mountain chain, every inorganic aggregate on the earth, thus, at some time or other, undergoes a reversal of those changes undergone during its evolution. Not that it usually passes back completely from the perceptible into the imperceptible, as organic aggregates do in great part, if not wholly. But still its disintegration and dispersion carry it some distance on the way towards the imperceptible, and there are reasons for thinking that its arrival there is but delayed."—First principles, Herbert Spencer, pages 526-527.

A mighty array of isolated facts and inductions from observations made by hundreds of students of Nature below its outer vesture await the review of that philosopher who shall marshal them into an orderly army. That synthesis completed, much of the lore of the miner will no longer present an appearance like Falstaff's regiment, a motley gathering of figures and phrases lacking an explanation of their import or relation, and without the uniform garb of scientific language that is so necessary to preserve the lines between one series of areas and another series—those in front and in rear of the learner. I trust that this new-born institute of ours will be an important factor in preparing many of us for deeper, wider, and more soundly scientific conceptions of the subjects that are part of our daily work.

## The Gold Deposits of the Indicator at Ballarat, Victoria.

The great Indicator of Ballarat is the most important of its class that I am acquainted with personally, and my reading does not furnish one other instance of the deposition of metals under like conditions and with unerring regularity over a lineal area of several miles.

For about 30 years past this storehouse of auriferous wealth has been exploited to a depth of 500 or 600 feet, and the diamond drill piercing its recesses still further brought up a piece of gold from about 2000 feet below the surface.

The Indicator is an extremely thin, nearly vertical pyritic sheet, encased in unaltered, or but slightly altered, slate, in non-fossiliferous Lower Silurian terranes.

Its thickness is seldom more than one-eighth of an inch, and in a locality where its minute cubes of pyrites give place to iron oxide, its appearance earns its title of "the pencil mark." The gold deposits along its track take the form of their enclosing mold, and are frequently as solid as nuggets won from the drifts.

Many tons of gold have been won from these depositions mostly in the form of nuggets, the largest recorded being the "Criterion," found by the Parade Company, and weighing over 300 ounces. A mass weighing about 500 ounces was won by a private company working on the same golden track, about three miles south of the former nugget's location. Of this last I have satisfactory evidence from friends, and including that I have also obtained from an officer of the Victorian Department of Mines.

The receivers of all the leached out golden solutions of this vertical seam and its impregnated walls of slate, whose thin laminae are veined with pyrites, are the semi-horizontal veins of quartz, which, crossing the lines of stratification at almost a right angle, are sometimes linked with the greater load system of this auriferous zone.

The intercalated veins of quartz are seldom more than a few inches in thickness, nor are they of importance to the miner, excepting where they are enriched for a few inches below the intersection of the Indicator.

A slight drop in the receiving vein of quartz on the side of its greatest angle with the Indicator is regarded as more favourable for the concentration of the golden metal.

The later movements of the earth's crust have given origin to a great number of displacements of the rocks and the lodes they contain, but there is not any marked variance of the mode in which these deposits of gold occur.

Miles of drives are constructed along these golden tracks every year, but the track remains, only a little deeper for those who take up the running next year.

## The Gold Deposits of the Slate Rocks at Ballarat.

If auxiliary evidence were wanted as to the mode in which the gold deposits of the Indicator have had their origin, it can be found in studying the minor concentrations of nugget-sand and gold-bearing quartz in the slate rocks to the west of the Indicator. Here are bands of slates of much greater dimensions than are those alternating with the sandstones in their vicinity. The veins of quartz cutting through these slates in nearly horizontal layers are usually thin, and are only of economic importance within the area of the slates.

Most of the gold is distributed through the quartz vein, but strings and pockets of that metal occur also in certain limits. As a general rule, that portion of the same quartz veins is barren of gold, or nearly so, where it cleaves the sandstone, and thus it is that the auriferous areas in a zone where slate and sandstone occur alternately in every yard or two of easting and westing are known as the eastern and western slates.

In this locality, and for a distance of some miles southward, it is every day exemplified in mining among these semi-horizontal veins of quartz, that they are unproductive when in contact with sandstone. As a general rule, the greater sandstone belts in these terranes divide the auriferous zones of the district into productive and non-productive areas. This last rule also applies, broadly speaking, to that greater region of ancient drift deposit, whose explored areas are so much more extensive than are those of the lodes in the same district. In the last case we have a great deal of evidence that much of the detrital gold remains near the source whence it was once derived.

In advancing a theory to account for the origin of the gold once held in the slate masses, I believe it is not quite an original idea to propound the view that the mud of the ancient Silurian seas was a ready precipitant for some of the gold contained in those waters; that in the evolution of the stratified rocks from the sediments of these seas their metallic contents were held secure until the latest uplifting of the earth's crust placed the slates and sandstones in a nearly vertical position. The lodes

slowly filled the fissures caused by the dislodgment of the rocks from their olden position. New lodes formed on the planes of older lodes, and in the interstices between the greater lodes at right angles or nearly so to the lines of stratification were formed those semi-horizontal veins of quartz. The slow infiltration of water, to say nothing of those changes whose deciphering lies in the domain of the chemist, commenced again the dispersion of the gold from its matrix of slate.

In the veins I have described were the interruptions to the downward passage of the golden solutions, and thus it is that their accretions in a few places as they were precipitated still await a final dispersion by the modern treasure-seeker who comes armed with gifts from the gods.

**The Lode System of some Districts in South Australia** is eminently favourable to the deposition of metals in shoots or bunches, as they are termed by the miner. The comparatively low angle at which they dip from the horizon affords a resting place in their planes for the metalliferous solutions disintegrated from their matrices in the hanging walls of such lodes. These additions to a lode's contents are strictly limited to certain natural conditions in the superincumbent vein, and the lode or fissure receiving the re-distributed metals. The vein which has released its contents may be an almost imperceptible thread, and yet its transferred stores be extremely valuable. It will be obvious that the superficies of even a thread-like marking in a headwall may be of immense extent in a lateral or vertical direction, although either of these dimensions may represent but a fraction of its earlier proportions.

It will save a possible confusion of ideas if I apply the term Indicator to all matrices whose metals are depleted and transferred to other veins, and term the latter receivers. A vein cleaving through a lode or system of lodes is evidently of later origin than such lodes. It will not enrich these lodes, for there is not any interruption to the downward passage of its dispersed contents, which must be carried within its own planes. The Indicators are necessarily of anterior origin to the receivers that intersect them.

I do not possess any evidence to show that these features of lode mining have been considered in this province—South Australia. In a district adjacent to that I am writing from (Wadnaminga) I know that these deposits were overlooked, and on making inquiries among the miners coming here from various districts I find a unanimity of opinion that they had not previously learned to seek for deposits on the lines described in the foregoing argument, with one exception, and that one a Ballarat manager long familiarised with the nuggety deposit of its famous Indicator. The early managers who came to this district failed to recognise this mode of deposition occurring in many of the lodes here. I do not know any other mining district where the occurrence of metalliferous deposits of this class is so general as it is in this portion of the north-east country.

The principal reason for the small veins of the hanging walls of the lodes becoming so important to the miner is almost wholly contained in the one natural feature common to so many lodes in South Australia, as I have already indicated—viz., the low angle at which the receivers dip.

I do not wish to extend this article beyond the narrow limits outlined in the preceding paragraphs, but I must point out that the greater lodes of this north-eastern country bear evidence that they are immensely older than are the lodes of Victoria. As a natural sequence, they "have undergone a reversal of those exchanges experienced during their evolution" over a greater period.

The uniform smallness of the Indicator veins of the lode walls prevented the access of meteoric waters to their interior in any but small quantities. Consequent on this, their leaching out was prolonged far beyond that period at which the metals of the greater lodes were disintegrated and dispersed downward.

My experience of this last class of gold deposits is as follows:—The little Indicator veins, like their larger brethren among the lodes, are in part composed of barren materials, and in some cases they are not yet sufficiently decomposed to part with their metals. Thus the depositions we seek are only to be found where the Indicator above us is decomposed, and where it had been metal-bearing.

The deposits are invariably on the lowest side of the receiver, following, of course, the law of gravitation, but showing to the student that an infinitely great period of quiet has reigned since the last oscillations of earth's bosom were felt by these rocks.

A great deal of gold is in sponge form, or in delicate filaments and spicules or minute flagree work. Some of it has by the addition of silica or iron been sealed up in the lode matrix, while the greater part fills the druses. The crystals of the last not infrequently have gold adhering to them, and more rarely have I found a small crystal of quartz pasted on its surface and minute specks of gold on the exterior of the crystal.

These Indicators, like that very different one of Ballarat, may enrich a number of receivers, if the last take the form of alternate layers. A fissure filled with clayey matter may arrest some portion of the dissolved minerals on their downward course, and thus give origin to the popular theory that their deposition resulted from the action of some unit of the force expended in forming the fissure.

The largest masses of native silver yet discovered in Australia—probably the largest in the world—were found at Broken Hill under precisely similar conditions to those I have last described.

You will readily concede to me that it is almost certain that these classes of ore deposits are a more general characteristic of the lodes in this province than they have hitherto been expected to prove. In one case that has come under my notice a few tons of rich silver ore were found in this district, and the owners failed to trace it any distance downward; my reading of their experience, from an inspection of their old workings, is as follows:—The most ancient system of lodes in this district I refer to—i.e., the "buck" or barren lodes—are segregated masses studding the country rock. In the wrinkling of the terranes during the metamorphic epoch these ancient lodes were dislocated and folded up in the half fused mass. In the case mentioned, the Indicator vein had precipitated its argentiferous contents on one of these fragmental masses. Thus the indicator, although continuing on its course downward, was overlooked in seeking for a continuation of the silver ore, as the exploiters soon found that the quartz mass could not be traced downward. In popular language, "another lode was found to be a mere blow," which, of course, is a very stupid explanation of such occurrences, but is a very common one indeed.

Surrounding the small group of facts I have presented in the foregoing paragraphs, there is a still larger mass of data as evidence of the soundness of that generalisation of the great English sage whom I have quoted in the preliminary lines of this paper. . . . The wisdom of our mining world is an ever-increasing store of wealth, and, like the fabulous treasures of some princes of the Orient, its extent and value may never be ascertained by any but a few fortunate people.

## Discussion.

Professor TATE: Is it your wish that the thanks of this meeting be conveyed to the author of this paper?—(Applause.) It is carried.

Mr. LIDGER: As regards the first two papers that were given

\* The first paper read at the inaugural meeting of the A.I.M.E.

† Mr. John Davey, director of an adjoining company, and Mr. R. Featherstone, a mining manager, told me lately that this mass of gold was seen by them, and weighed about 900 ounces.—F.D.J.



by Mr. Johnson on the Pencil Mark and Indicator lines he makes an error, perhaps a slip of the pen, when he says that, owing to the percentage of pyrites and oxide of iron, the Indicator changes its name to the Pencil Mark. They are two distinct parallel lines, with the exception that the Pencil is just about as wide as a carpenter's pencil, hence its name. [Mr. Lidgley sketched a diagram of the lodes, showing the crossing of the veins, and he described the formation of the lines.] Continuing, he said—I am engaged in working these out, and although I have given details, I have not sufficient information to give definite statements as to the occurrence or the theory of it. After working it out to the satisfaction of the Department of Mines I hope to provide the Institute with a fully matured paper on the subject. In most cases the Indicator is dipping east and pitching north about 15 to 20°. The Pencil Mark is very small or thinner, with the same veins running right across it, while the eastern and western lodes are about 210 feet east and west of the Indicator.

Mr. EAST: Does the gold occur in the quartz?

Mr. LIDGLEY: There is gold running through the quartz in fibrous specks. The further you get away from the Indicator the finer the gold.

Professor TATE: Are the Indicator and Pencil Mark the same in quality?

Mr. LIDGLEY: Exactly the same.

Professor TATE: Do they limit the auriferous area?

Mr. LIDGLEY: No. Beyond this there is another dip, making a total distance of 60 feet, and this is limited by another about 60 or 65 feet beyond, and even then there are some others, but very poor, until you get to the slates.

Captain WARREN: What is the composition of these lines of deposition?

Mr. LIDGLEY: Presumably graphitic schists.

Mr. EAST: Practically there is only 60 feet between the Indicator and the Pencil Mark. They are almost similar to the two walls of a very wide lode. Is there any movement in the strata?

Mr. LIDGLEY: No. There is coincidence in the stratification.

Mr. DUDLEY: There is an attempt in the paper to assist classification or systematising of lodes or lode systems. That is the first attempt of the kind in the colonies, and the paper will assist the study of this very much.

## THE ACCUMULATION OF AMALGAM ON COPPER PLATES.\*

By R. T. BAYLISS, Marysville, Montana.

ALTHOUGH every millman of even limited experience in the amalgamation of gold ores is probably aware that copper plates will, in time, become coated by the accumulation of gold amalgam, it may be that many do not know to what extent this accumulation occurs in the treatment of ores dissimilar to those with which they are familiar, and under conditions foreign to those with which they have to contend in any given locality. The writer, therefore, feels relieved from the necessity of offering an apology for dealing with such an elementary subject, believing that certain facts in reference thereto, which have recently come under his personal observation, will be interesting to many, and possibly instructive to some persons engaged in the amalgamation of gold ores.

The facts hereinafter stated were observed in the 50 stamp "combination" mill, owned by the Montana Mining Company (Limited), of England, operating the Drum Lummon Mine, situated at Marysville, Montana.

The material treated in this mill consists of quartz and ores of somewhat variable character containing gold and silver in native form, as well as in chemical union with the sulphides of iron and copper. There is also present a little lead, some arsenic and antimony, and a little zinc. The last four minerals, however, are of irregular occurrence and but sparingly distributed throughout the ore, and yield only a trace in the analysis of the average material in this mill. The free gold, which is in a condition of fine division, and rarely visible to the naked eye, carries silver as an alloy; and the native silver, which is only occasionally observed, is present in the richer ores in wire and leaf form.

Of the two precious metals, the ore worked during the past three years and ten months, the period under review, contained about  $\frac{1}{2}$  ounce of gold, and from 7 to 12 ounces of silver per ton of 2000 lbs.

The ore, after being crushed in the stamp battery, and passed through a 30 mesh steel wire screen, runs over amalgamated copper plates, and is then concentrated on Frue vanners, to the distributor of which is affixed a small copper plate for saving any amalgam escaping from the battery plate; the tailings from the vanners being subsequently amalgamated in pans.

Amalgamation upon copper plates placed inside the mortar is not practised in this mill, better results having been obtained by amalgamation on outside or apron plates only. It is not the purpose of this paper to enter the wide field of discussion as to the relative merits of inside and outside amalgamation; but it may be observed in passing that an extended experiment upon the two methods proved that a higher percentage of saving was gained by amalgamation outside the battery, than by the use of inside plates in addition to the apron plates.

The apron plates in use in this mill are 54 inches wide and 8 feet long; made of  $\frac{1}{2}$  inch rolled copper plate, electro plated with 1 ounce of silver to the square foot. They are set with a fall of  $\frac{1}{4}$  inches to the foot; are cleaned up once in 24 hours, and dressed once every two, three, or four hours, as may be deemed necessary by reason of their surface condition, which varies according to the mineral contents of the ore submitted to them. In dressing, a weak solution of cyanide of potassium is used when necessary. The copper plates upon the Frue vanners are 48 inches wide, and 18 inches deep, made of  $\frac{1}{2}$  inch rolled copper plate, electro-plated with 1 ounce of silver to the square foot, and are subjected to the same treatment as the apron plates.

At the daily clean-up, the surface of the apron plates is first washed; then, the amalgam which has collected during the preceding 24 hours is slightly softened and loosened by sprinkling a small quantity of mercury over the plate and rubbing the surface with a cloth or whisk-brush, after which the amalgam is removed with a stiff rubber scraper, 4 inches wide, made out of rubber belting. In this process the daily accumulation of amalgam is removed as completely as possible without the application of a steel scraper, the use of which is not permitted, except for the removal of blisters, or any fixed impurity which may occasionally be found upon the plate.

The foregoing brief summary of the method employed in this mill will be sufficient to explain the general conditions surrounding the amalgamation of the free gold contained in the ore, and the treatment to which the copper plates are exposed.

To return to the special subject indicated by the title of this paper: One of the copper plates employed in this mill was re-

cently removed, after having been in continual service for three years and ten months. During this period, the battery of five stamps which it served crushed 14,942 tons of ore, yielding from amalgamation on this plate 6428 ounces of bullion, 541.5 fine in gold, and 443.9 fine in silver, giving a standard assay value of \$11.70 per ounce, and showing the recovery of \$5.03 per ton of ore crushed. In fixing the total tonnage of ore passed over this plate, and the yield in bullion therefrom, the total tonnage and production of the mill during this period has been divided by ten. As all the stamps have been operated continuously, this proportion should correctly represent the duty performed by the particular plate under consideration.

The agreeable task of removing the amalgam, known to have accumulated upon this plate (which was new when put in), was then undertaken, and the accumulation or scale was removed by striking the back and front of the plate with a light hammer, a small block of wood being used to deaden and distribute the blow. By this means the plate is slightly buckled, causing the amalgam to scale off, and leaving upon the original electro-plated surface but an insignificant film or layer, which is subsequently removed with a chisel or scraper.

Other methods, such as sweating with hot water and immersing the plates in chemical solutions, have been tried, but have proved unsatisfactory; and the process of buckling the plate, although a somewhat drastic and unscientific method, has been found to effect the recovery of the highest percentage of the accumulated amalgam. After this treatment, the plate is usually so damaged as to be unfit for further service; but, notwithstanding that every visible portion of amalgam has been removed, the copper plate is still found to carry a considerable quantity of gold and mercury; and upon being cut up and melted into a bar, the value of the gold and copper contents amounts to more than twice the value of a new plate; hence the substitution of new plates for old is an expenditure which can be viewed without concern.

The results obtained from the foregoing treatment of the particular copper plate here specified were both interesting and of substantial value; the scale or accumulation of amalgam at the head of the plate being no less than 0.16 inch in thickness, and gradually decreasing to a bare  $\frac{1}{4}$  inch at the lower end.

The total weight of the amalgam so recovered was 160 lbs. avoirdupois, which, upon being retorted, yielded 60.5 lbs., or 38 per cent. of crude bullion, and produced after melting a gold bar weighing 866.1 ounces troy, which, upon assay, proved to have a total fineness of 993.9, being 431.4 fine in gold, and 562.5 fine in silver, and having a standard value of \$9.63 per ounce, thus making the total value of bullion, recovered from the accumulated amalgam upon this one plate, no less than \$8340.54.

It may be remarked that the results recorded in this instance are not by any means exceptional. Other plates in this mill, placed in service at the same time as the one forming the subject of this paper, appear to be coated with an accumulation of amalgam of equal weight and value; and, moreover, within the writer's experience of other plates removed from this mill in past years, is an instance in which one plate yielded accumulated amalgam in excess of \$11,000.

An examination of the facts observed in the course of cleaning this plate, and converting the amalgam into bullion, reveals one or two interesting features which appear to be worthy of record.

As stated above, the percentage of bullion in the amalgam obtained was 38 per cent.; whereas the amalgam from the daily clean-up never contains more than 20 per cent. of bullion, and frequently not more than 10 per cent. This is, no doubt, due to the circumstance that the amalgam remaining upon the surface of the plate is subjected to greater compression than that which is cleaned off, and merely strained through canvas sacks.

The accumulated amalgam obtained from the plate in the shape of scale does not appear to suffer any visible alteration in form or size during the process of retorting. A piece,  $\frac{1}{2}$  inch thick and 1 inch square, will pass through the ordeal of retorting and emerge as crude bullion, having preserved, without apparent loss, its original dimensions, and still retaining on its surface any ripple marks or imperfections which it bore during its existence as amalgam.

A comparison of the fineness of bullion obtained from the accumulation of amalgam upon this plate, with the average fineness of bullion produced from the daily clean-up of the plate, during its service of three years and ten months, of which one would suppose the accumulated amalgam to be a fair sample, shows that, to a striking degree, this is not the case.

The average fineness of bullion obtained from daily clean-ups during the period mentioned was Au, 541.5; Ag, 443.9; total, 985.4, whereas the fineness of bullion obtained from the accumulation upon this plate during the same period was Au, 431.4; Ag, 562.5; total, 993.9; from which it will be observed that, although the total fineness of the latter, 993.9, is greater than the fineness of the former, 985.4, the gold fineness is 110.1 less, and the silver fineness 118.6 more.

That the total fineness of bullion from the accumulated amalgam should be higher than that obtained from the daily clean-ups is not a matter for surprise, since the amalgam gathered from the plates from day to day would naturally contain a higher percentage of impurity and base metal than the amalgam which adhered to the surface of the plate; but it does not clearly appear why the gold fineness of the latter should be so much lower than that of the former, the difference being represented by a corresponding increase in the silver fineness.

In explanation of this inconsistent feature, it has been suggested that the native silver contained in the ore has a greater tendency to accumulate upon the plates than the free gold, owing to its stronger affinity with the amalgamated surface. If theory furnishes any authority for such a statement, it is rudely disproved by actual experience in this particular instance; for test samples of the accumulated amalgam from the head and tail of this plate prove the former to be 0.20 finer in gold than the latter, with a corresponding increase in the silver fineness of the amalgam from the lower end of the plate.

Furthermore, the amalgam saved upon the copper plates forming the distributor of the Frue vanners invariably shows, upon assay, a lower gold and a higher silver fineness than the bullion recovered from the treatment of the same ore upon the battery plate; a sample of this vanner amalgam yielding bullion assaying Au, 380.5; Ag, 602.0; total, 982.5. In other words, the silver, instead of showing a strong affinity with the amalgamated surface, gives evidence of a persistent tendency to escape amalgamation, as proved by the foregoing assays, which show that the gold fineness of bullion is highest nearest to the battery, and gives place to a steadily-increasing silver fineness as the amalgam is deposited upon the copper plates at greater distance from the battery discharge.

The natural conclusion to be drawn from these facts and figures would justify the expectation that the bullion derived from the accumulation of amalgam on copper plates would be of equal (if not of higher) gold fineness to that recovered from the daily clean-ups upon the plates during the period in which the accumulation was in progress. The foregoing facts, how-

ever, incontestably prove that such is not the case; and the purpose of this paper will be served if the facts herein presented, which have been prepared with due regard to accuracy, are the means of suggesting an explanation of this interesting inconsistency, which the writer most frankly confesses himself unable to supply.

## LATEST FROM THE MINES.

### CABLEGRAMS AND TELEGRAMS.

**ALADDIN'S LAMP.**—The following cablegram has been received from the superintendent at the mines:—"Five weeks return totals 939 ounces of gold (approximate value, £3440)—namely, 339 tons of ore have been crushed, yielding 834 ounces; and 3 tons rich crude ore have been shipped, containing 105 ounces."

**ALASKA TREADWELL.**—Cablegram from Alaska reports the clean-up for the month of March as follows:—"Period's new last return, 29 days; bullion shipment, \$38,181; ore milled, 17,940 tons; sulphurets treated, 282 tons; of bullion there came from sulphurets, \$12,664; gross expenses for period have been \$24,649."

**BANNER.**—The manager's mailed report for the week ending March 14 is as follows:—"For the week just ended (March 14) we have advanced the 900 crosscut 5  $\frac{1}{2}$  feet, making its total length 46 feet; we have also constructed a tank in the shaft rock by blasting, having a capacity of 2500 gallons, and placed our pump at this station, and completed all necessary arrangements for sinking with winze pump, and at 3 p.m. to-day, Saturday (March 13), we commenced sinking, and expect to go right down without delay to the 1030'. The following has been received by cable from the manager:—"Shaft has reached the depth of 950 feet. The prospects are encouraging. Everything looks well."

**BAYLEY'S REWARD NO. 1 SOUTH.**—The following cable, dated the 30th inst., has been received in London:—"Heavy rains (2  $\frac{1}{2}$  inches); 500,000 gallons in dam."

**BAYLEY'S REWARD.**—The following cables have been received by this company's London office from its head office at Melbourne, dated March 27:—"Trea is moved on the ground; insufficient labour; there is no cause for anxiety; absolutely have no case against us." Dated March 31:—"Heavy rains 2  $\frac{1}{2}$  inches; 30,000 gallons in dam."

**BUFFELSDOORN ESTATE AND GOLD.** The J. J. de Burg Consolidated Investment Company announce receipt of the following cable from the above company:—"Board has resolved to discontinue milling operations until the 170 stamps in course of erection will be complete. The course suggested will ultimately prove most economical method, as the erection has been found to interfere with milling. In the meantime development will be carried on at the utmost speed."

**CENTRAL MENZIES.**—Cablegram received from Mr. Ballard, dated Menzies, March 29, re Emulator:—"The north drift 42 feet. The vein is 1 foot, dry assay 3 ounces 7 dwts. per ton."

**CONSOLIDATED BELLINGWE DEVELOPMENT.**—Recent mail advices have been to the effect that developments were actively proceeding with favourable results, particularly on the Bob's Luck, Wanderer's Rest, and Dobie Reef properties, but that operations had been much retarded through scarcity of native labour.

**COROMANDEL.**—Telegram, dated March 30, from the mine:—"The mill has started to-day."

**EAGLEHAWK CONSOLIDATED.**—This company has received the following cablegram:—"Total depth sunk in the shaft since February 8 has been 80 feet."

**FREDERICK THE GREAT.**—Cablegram from Bendigo states:—"Specks of visible free gold winze from 580 level. It will be seen upon the plan sent."

**GULLEWA.**—A cablegram has been received from Messrs. F. W. Prell and Co. (the Melbourne agents) stating that a 10 stamp battery complete has been shipped from Melbourne, and was expected to arrive at Geraldton on Tuesday, the 31st inst.

**JUBILEE.**—Cable dated March 31:—"Have declared a dividend of 4s. per share, payable to all shareholders registered on April 7."

**MARBEILA IRON ORE.**—The directors have received the following telegram from the mines:—"Output of ore for March 3591 tons."

**MAORI GOLD MINE.**—Copy of cable received from Mr. C. J. McMahon, the managing director in Australia:—"Maori (Menzies). Have commenced erecting machinery."

**MENZIES "CRUSOE" GOLD CLAIMS.**—The following cable information has been received from the manager at the mines:—"Four feet mundie reef in the bottom of winze Robinson Crusoe C shaft, assay value 3 ounces per ton."

**MENZIES PIONEERS.**—Copy cable from Mr. R. Ballard, the manager at the mine, of March 29:—"Lease 1404, south drive 42 feet level. Depth of winze 14 feet. The vein is 1 foot wide, and gives 255 dwts. (12  $\frac{1}{2}$  ounces) per ton.—Lease 3082, south shaft. Depth of the shaft is 11 feet. The vein is 1 foot 9 inches wide, and gives 206 dwts. (10  $\frac{3}{10}$  ounces) per ton."

**MESQUITAL DEL ORO.**—The following cablegram, giving the result of the March mill run, has been received from the mine:—"50 stamps ran 624 hours (26 days), and crushed 2864 tons of ore, yielding 559 ounces of bullion; value about £1670."

**MILLS' DAY DAWN UNITED.**—Cablegram from the head office in Charters Towers:—"Have crushed during the month 924 tons of quartz for 656 ounces of gold." The approximate value of the above return is £2250.

**MOUNT MAGNET.**—The following cablegram has been received from the general manager, dated March 30:—"Sinking the shaft; auriferous dyke looking first rate; carrying specks of visible free gold. We think this lode will yield an ore body of considerable value."

**MYSORE WEST AND MYSORE WYNAD CONSOLIDATED.**—A telegram has been received from the Tank Block Mine giving March crushing of gold as follows:—"After a mill run of 520 hours 1300 tons 701 ounces."

**NEW GUADALCAZAR QUICKSILVER.**—The following cable has been received from the mines, viz.:—"The production during the month of March amounts to 6800 lbs. of quicksilver, equal 88 flasks. Have shut down furnace for a short time for necessary repairs. I send you draft for £500."

**NEW QUEEN.**—A cablegram, dated Charters Towers, March 28, gives result of crushing for past fortnight as follows:—"165 tons yielding 240 ounces gold. Mining operations suspended three days for repairs to shaft. Have drawn on you for £1000."

**NEW CHUM (Bendigo).**—The following cable has been received from the manager, Mr. L. A. Samuel:—"Have commenced driving level at 552 feet on the course of the reef. The reef shows gold freely, and will be highly payable (profitable). Crushings will commence as soon as we have opened up sufficient to keep battery going. Sinking shaft has been resumed."

\* Paper read before a recent meeting of the American Institute of Mining Engineers.



ORITA.—Cablegram from the superintendent relating to run No. 89:—"We have cleaned up £200."

PESTARENA UNITED.—Gold return for March:—432 tons of ore produced 861 ounces of gold, equal to 1 ounce 19 dwts. 204 grains per ton.

RHODESIAN MINERAL PROPERTIES.—The following cable has been received to-day from the company's agent, Bulawayo:—"All properties transferred to your name."

SIR JOHN FORREST (Hannan's).—The following information is to hand from Mr. J. Woolcock, the manager:—"No. 1 shaft. Have completed timbering, and have cut plat at 90 feet. Intend to continue sinking of shaft a further 100 feet. At No. 2 shaft have extended south drive on reef 9 feet, total 17 feet. No material change. Have erected stable and whip derry, and purchased whip horse, &c."

ST. JOHN DEL REY.—Telegram received from Mr. Chalmers:—"Produce 11 days, second division March, 10,500 oits., equal to 1210 ounces troy; value £4069. Yield per ton 5.7 oits. ('65 ounces troy)."

TALISMAN.—Cablegram from the manager at Black Flag:—"Have made a new discovery.—Talisman west. The assay value of the ore is 5 ounces per ton of 2000 lbs.; the average thickness of the quartz is 4 feet."

THE JOHANNESBURG WATERWORKS ESTATE AND EXPLORATION.—Average weekly consumption for December, 1895, 5,304,000 gallons; and January, 1896, 4,914,750 gallons; as against 4,880,000 gallons and 5,393,400 gallons for the same months in 1894 and 1895 respectively.

VICTORIA GOLD MINING ASSOCIATION.—The following cablegram has been received at the London office:—"481 tons crushed yielded 703 ounces gold."

WEST AUSTRALIAN AND GENERAL ASSOCIATION.—Cable from agents at Melbourne:—"Henwood, mine manager, reports: Samples taken in No. 3 shaft and in the north drive, average 4 ounces 18 dwts. With reference to Allan's addendum report: At a point in the No. 3 shaft south drive, distance 102 feet from the shaft, a second reef was struck adjoining the present reef. Parallel reef shaft No. 3. Developments are favourable; assays average 3 ounces 6 dwts. per ton."

WOODSTOCK (New Zealand).—The result of the past month's working is announced by cable as follows:—"Crushed 292 tons for £1149."

## THE ORE DEPOSITS OF THE AUSTRALIAN BROKEN HILL CONSOLS MINE, BROKEN HILL, NEW SOUTH WALES.

By GEORGE SMITH, Broken Hill, N. S. W.

THE Australian Broken Hill Mine is situated within a third of a mile eastwards of the famous Broken Hill Proprietary Mine; but, so far as has yet been proved, the respective lodes have no connection whatever. The Proprietary line of lode, striking north-east and south-west, is coincident with the bedding-planes of the enclosing gneiss, and according to Mr. E. F. Pittman, A.R.S.M., Government Geologist, is undoubtedly a saddle formation. This opinion, which met with much opposition at the time it was advanced, is now, I understand, being generally confirmed as the work of development opens out fresh areas for observation along the line of lode. The lode is of immense thickness—in places over 300 feet—and though it has been found to contain sufficient quantities of secondary silver compounds to yield phenomenal outputs of silver, its principal constituents are various lead and other ores, and it would appear more correct to regard it as an argentiferous lead deposit than as a silver lode proper.

The Consols lode differs from its gigantic neighbour in every respect. With an average thickness of not more than 18 inches, it has been worked along its course for upwards of 1300 feet, and at every point yet explored has been found remarkably well-defined and persistent. With a strike east and west, it cuts obliquely across the bedding of gneiss and schist, continuing uninterruptedly through various bands of eruptive amphibolite. The dip, which is to the south, ranges from 24° near the surface to nearly vertical in the lower levels; but the alteration is not regular, as in places the lode is almost flat, and this at a vertical depth of over 300 feet. These changes of inclination have had no effect on the ore deposits, which, as I shall endeavour to show, have been governed entirely by "cross-veins" traversing the lode at different angles. It is only at the points of intersection of these "cross-veins" with the lode that important bodies of ore have yet been found.

The ore deposits discovered up to the present time have been much scattered, and have consisted almost exclusively of silver-ores proper, the bulk of the metal being present in the form of stromeyerite and other permanent silver sulphides, which have been found to possess the same characteristics in whatever part of the mine they have been found. We may thus regard this as essentially a silver lode, presenting the features of a fissure vein.

All the ore yet won has been confined to those portions of the lode which are inclosed in the amphibolite, and the boundaries of this rock have been proved to be identical with the limits of the ore-bearing shoots. Where the metamorphic rocks have been intersected the lode invariably pinches, sometimes showing no more than an inch seam of flint. Three separate bands of amphibolite have so far been more or less explored, each apparently possessing the same peculiarities and possibilities, but of these only one has been extensively worked; and it is to the occurrence of the ore in this that I would direct attention, with no more than a passing reference to the others.

To a vertical depth of about 130 feet the lode gangue is limonite, and below this, siderite and calcite; these latter minerals often showing the banded structure characteristic of fissure veins. In the zone of oxidation of the siderite, the removal of the calcite is practically complete; but where this oxidation is still incomplete and the siderite is altered externally only into limonite, the calcite is found in a partially dissolved condition, the solutions having penetrated some distance into the cleavage planes, but not far enough to effect entire solution. The siderite having been the first of these two minerals to be deposited on the walls of the lode, it has (where it did not entirely fill the fissure) crystallised before the calcite was introduced. The removal of the latter mineral has, in consequence, left the upper part of the lode in a more or less vuggy condition, with very fine pseudomorphs of limonite on the hanging-wall; and on these various minerals of subsequent deposition are occasionally found.

The gangue dissolving above has been carried downwards and deposited in the interstices of the lode, generally as a sludge, but sometimes showing incipient stages of crystallisation. These changes can be seen still going on as the surface waters dissolve and carry down the more soluble minerals, the deposition readily taking place in open, undisturbed parts of the mine.

A similar process of alteration and removal has been

observed with regard to some of the silver minerals; but where the silver has been partially or entirely leached out precipitation has apparently taken place in the immediate vicinity, in some instances probably on the very masses from which it had been so removed. This will be further explained with reference to one mineral which has been extensively altered, and which will come under notice in due course.

The ores of the mine exhibit many varieties, some of which have not been found elsewhere in the district, or, in fact, in Australia; but with four exceptions these rare minerals occur in small quantity, and it is unnecessary for the purposes of this paper to make extended reference to them. The following are the most important, and are named in the order of their productiveness:—

	Containing silver.
1. Stromeyerite .. .. .	Per cent. about 30
2. Dyscrasite .. .. .	72 to 94
3. Antimonial silver chloride .. .. .	50 to 78
4. Fahlerz .. .. .	about 20

In dealing with the deposition of these minerals, I will confine my remarks to Nos. 2 and 3, as being the most uncommon and difficult of the series to account for under the ordinary conditions of deposition; but before dismissing the others, it may be interesting to note that Nos. 1 and 3 have not been met with in the lower workings, though each has been found at some distance below the water level. Nos. 2 and 4 take the lead in depth, and each has been found scattered through the gangue in small quantities, ranging in size from grains to lumps, weighing nearly 56 lbs. These small deposits have been found to assume a distinct track, and are evidently the continuation of the larger deposits worked in the upper levels, and deposited under conditions which I shall endeavour to explain.

A peculiar fact in connection with the ore bodies is their constant association with small quantities of cobalt minerals. They are apparently inseparable; and, to the best of my recollection, neither has been found without the other. Where it occurs within the zone of oxidation, the cobalt ore is generally more or less altered, and is then often argentiferous, sometimes to the extent of 5 per cent.; but, as a rule, it does not occur in immediate contact with the silver ore, but in a separate vein of lode material either above or below the latter. Below this zone the cobalt is almost solely in the form of cobaltite, and though it has been found in intimate mechanical mixture with the silver ore, it is practically free from the latter when in its unaltered state.

The term "cross vein," used herein, is adopted simply for convenience, and in preference to "indicator," a term which has been extensively used in Ballarat, Victoria, as referring to small bedded veins of slate or pyrites which have been found to strike across the auriferous quartz lodes, leading to the discovery of important deposits of gold at the points of intersection with the lodes. The presence of these "indicators" may have had an effect upon the gold analogous to that which I believe the "cross veins" of this mine have had upon the silver deposits.

In that band of diorite (amphibolite) which contains the shoot most extensively worked, two separate and parallel "cross veins" have been found; but, unlike the "indicators" of Victoria, neither is continuous. Their course is approximately north-east and south-west, following the direction of the shoot, and wherever they have been met with, valuable deposits of silver have been found at the points of their contact with the lode. The larger of these falls vertically on the lode, and is composed of varying proportions of blende, pyrites, &c., with quartz, the thickness ranging from a mere streak to over 3 feet. By far the largest bonanzas yet found were in association with this "cross vein."

The smaller "cross-vein" is composed of biotite with clay, &c., but similar deposits have been connected with it, including several remarkable minerals, of which space forbids a description here. A very interesting discovery of a slab of dyscrasite must, however, be mentioned. This had been deposited in a vug in the siderite, the roof of which was perfectly crystallised; and the silver ore, when deposited, had taken a complete cast of the crystals. On being freed from the gangue this specimen weighed 87 lbs., and presented a most interesting appearance.

Both the "cross veins" have been found to cut out and make again at irregular intervals for a considerable distance; but in depth both have been lost, and operations are now being directed in the lower levels with a view of picking up their continuation. The larger "cross-vein" has been faulted by the lode; and though it has been traced in an almost direct line for nearly 600 feet, it would probably be more correctly described as a succession of rock-joints formed along a line of weakness, and enlarged in places by a process of removal and replacement. The biotite-vein is not so persistent; but it may have been of analogous origin, the minerals filling it being, no doubt, the result of a chemical rearrangement of the enclosing amphibolite.

In another part of the mine, 500 feet to the east, a separate shoot is being worked, which has yielded the same class of silver compounds, deposited under similar conditions. This shoot is crossed almost at right angles by a veritable cross-vein of pyrites, and though this vein presents certain slight dissimilarities to those above referred to, its effect upon the silver solutions appears to have been exactly the same; the ore occurring at the point of its junction with the lode.

It will thus be seen that wherever the cross veins have been found to make junctions with the lode, valuable deposits of silver have been found, and no important find has yet been made except where a "cross vein" has been in evidence. The lode-gangue is very often composed of most "kindly" material, which as a rule is practically free from silver (averaging less than half an ounce per ton), up to within a very short distance of the ore bodies. It must, therefore, be admitted that whatever may have been the direct cause of the deposition of the silver, the cross veins have played an essential part in the process.

The dyscrasite has been found in quantities ranging from the smallest of films and crystals to huge blocks weighing over a ton; one piece, on being broken as small as possible for convenience in handling, weighed 16 cwt., and yielded fine silver equal to 80 per cent., the smelted value of which was over £4300 (1891). Another piece measured *in situ* 6 feet by 4 feet at its largest part, and averaged about 4 inches in thickness. The weight of this was about 23 cwt., but its silver value was rather lower. Altogether, over 6 tons of this mineral was taken from one deposit, yielding over 142,000 ounces of fine silver, together with other ore, principally stromeyerite, yielding an additional 335,000 ounces.

Practically the whole of the dyscrasite has been found crystallised; some of it, especially that occurring in calcite, being of great beauty. The most common varieties contained definite proportions of antimony and silver, as will be seen from the following analyses made of typical crystallised specimens:—

No.	Silver, per cent.	Antimony, Per cent.	agreeing with the formula	Ag. Sb.
No. 1=72.9	27.1	" "	" "	Ag. Sb.
No. 2=78.3	21.7	" "	" "	Ag. Sb.
No. 3=84.4	15.6	" "	" "	Ag. Sb.
No. 4=91.5	8.5	" "	" "	Ag. Sb.
No. 5=94.1	5.9	" "	" "	Ag. Sb.

The antimonial silver chloride is a specially interesting mineral, inasmuch as it carries with it certain evidences of alteration, from which much of its history can be gathered. All the deposits yet found have unmistakably shown it to be the result of alteration of dyscrasite. As I have previously observed, it is evident that the solutions which originally coursed through the lode must have been very varied. In a measure the effects of each can be traced by its varying action upon those minerals that were most susceptible to its attacks. The particular solutions that have resulted in the mineral now under notice would seem to have contained certain quantities of lime, magnesia, iron, &c., as chlorides probably; and they would, therefore, be very similar to those at present existent in the mine.

I am indebted to the kindness of Mr. E. F. Pittman, Government Geologist, for the following analyses of this mineral, which were made by Messrs. Mingay and White, analysts to the Mines Department. Unfortunately the samples analysed are not taken from the purest specimens, but they were the best procurable at the time. The silver-contents are unusually low:—

### Analyses of Antimonial Silver Chloride.

	No. 1, Per cent.	No. 2, Per cent.
Moisture at 100° C.	0.56	0.13
Combined water .. .. .	4.04	4.37
Silver .. .. .	47.46	45.87
Antimony .. .. .	16.87	20.72
Copper .. .. .	11	48
Lead .. .. .	62	31
Arsenic .. .. .	trace	trace
Gold .. .. .	trace	—
Lime .. .. .	3.78	4.25
Magnesia .. .. .	1.17	20
Ferric oxide .. .. .	2.11	45
Chlorine .. .. .	13.69	12.27
Insoluble (gangue) .. .. .	1.01	90
Oxygen (by difference) .. .. .	8.53	10.05
	100.00	100.00

It will be understood from these analyses that the alteration to which the dyscrasite has been subjected was very complete; and, in effecting this change it would appear that the solutions, in causing the combination of a certain portion of the silver as chloride, had leached out a further portion which was immediately precipitated on the exterior of the mass as ordinary cerargyrite. The remaining antimonide has been oxidised by the same means into antimonate, leaving the uncombined antimony behind as Sb<sub>2</sub>O<sub>3</sub>. Large lumps of this mineral have been met with, one weighing as much as 475 lbs. Many of the pieces, on being broken, showed the gradual action of the solutions, the outer crusts being completely changed, while the centre consisted of a kernel of unaltered antimonide (dyscrasite) which the solutions had failed to reach. The intermediate parts often displayed the partially altered mineral, the change having advanced insufficiently to destroy the original crystallisation. It is only above the unaltered siderite that this mineral has been found; and occasionally it is seen in close association with dyscrasite, which, probably because the solutions were unable to reach it, shows no sign of alteration whatever.

Various deposits of small nodules have been found quite loose in open spaces in the lode, necessitating the not unpleasant task of shovelling them out. Each was spherical, and coated with cerargyrite crystals; these had evidently been contained originally in calcite as nodular masses of dyscrasite, which, upon the removal of the gangue, had been dropped out and acted upon as I have described.

The action of the solutions upon various other ores has been noted; and though the effects in some cases are most interesting, producing compounds of a very complex character, these cannot be touched upon here. The dyscrasite, however, appears to have been specially sought out for attack; and it has been noticed that where there was intimate association with fahlerz, the chloride was not formed, but the leaching process was carried on in some instances to such an extreme that the whole of the silver was removed, leaving nothing behind but an insoluble white oxide of antimony. The quantities upon which such an extreme action has taken place appear to have been comparatively small, and generally the altered antimonide (dyscrasite) has been found as loose nuggets in the fahlerz, each coated with the antimony oxide, and showing beyond all doubt that it had been considerably acted upon by solutions of some kind.

In attempting to account for the deposition of these and the other silver-compounds of this mine, I assume that the metals were originally brought from below in solution (this with all deference to Dr. Sandberger), in which state they would remain until the conditions were so changed as to admit of their deposition. It may be held that having been dissolved by weak solutions, under high temperature and pressure, they would be deposited on the removal of those conditions in the open portions of the lode. This is probably true of the ore bodies of many mines, but in this case the chemical union of two elements of such weak affinity as silver and antimony, together with the constant association of the "cross veins," would suggest the application of a special force passing through the latter. All the evidence yet produced in the mine's development points to an essential connection between the ore deposits and "cross veins," and it would, therefore, seem only necessary to ascertain what that depositing influence has been, to understand how the deposition was brought about.

Geologists are agreed that electro-magnetic currents are continually passing through the earth's crust, and, if so, these currents would, I presume, be far more likely to use separate veins as mediums for their transmission than to pass through solid rock, no matter what its character might be. If we bear in mind these two important facts—viz. (1) that the deposits are always connected with the "cross veins"; and (2) that electricity is constantly passing, it appears to me that we need go no further in our search for the depositing agent, which has been a continual succession of electro-magnetic currents passing through the "cross veins," and causing the deposition—very often in remarkable combination—of the elements held in solution at the points of contact.

Unfortunately, the apparent absence of continuity deprives the "cross veins" of much of their value as guides to ore bodies; but, though they have not yet been proved to be continuous, I am, nevertheless, of opinion that they possess an unbroken connection of some kind, which, in the present state of our knowledge, we are unable to trace. This connection may be found in the ordinary rock-joints, but if so, they are too numerous and erratic to be followed with any degree of certainty.

The ore, as I have remarked, makes downwards in small quantity with more or less regularity, and, in the absence of any other known indication, is being followed in the belief that it will prove to be a connecting link between the large bodies, which will be found only where the conditions that were necessary to effect their deposition exist.

Such is the theory which the observations of several years have led me to form upon the occurrence of the ore deposits of this mine; and my object in publishing it is to elicit discussion, and so lead others, who may have had similar experiences, to



other parts of the world, to relate them. The electrical hypothesis is advanced because I know of no other agency that is capable, under the conditions I have described, of producing these results. There are, no doubt, among my fellow-members many who could supply additional evidence on the subject, either confirmatory or otherwise; and I trust this paper may be the means of inducing them to do so.

## MINING IN THE STATE OF CHIAPAS, MEXICO.\*

### Interesting Particulars of the Santa Fé Mine.

THE Santa Fé Mine, owned by the Chiapas Mining Company (Limited), of London, is situated in the department of Pichucalco, in the State of Chiapas.

This State lies to the south-west of Yucatan, on the borders of Guatemala, and at a former period formed part of that Republic. The mine, relatively to the Mexico City, is situated 17° 18' S. latitude and 6° 8' E. longitude. About 35 miles to the north of the mine is the small town of Teapa, in the State of Tabasco, the nearest postal and telegraph station. Sixty miles to the east of this town are the celebrated ruins of Palenque, one of the most extensive and interesting remains of prehistoric towns. The mine is situated at an elevation of about 1400 feet above sea level.

### Means of Communication.

A good mule trail has been constructed by the company from the mine through the valley of the Rio de las Sierras, for a distance of 37 miles, to the station of Ermita, on the banks of that river. Thence communication is made by the company's stern-wheel steamer and barges to San Juan Bautista, the most important town in either of the States of Tabasco or Chiapas, which is of great historical interest as having been the first town founded by Cortez during the conquest of Mexico. In the height of the dry season, the steel barges, three in number, carry 15 to 20 tons, instead of 30, and have to be poled for half the distance between these two points, but are usually able to take their full complement. By road the distance is shorter—51 miles—and easily covered in a day's ride in dry weather, the whole of the route being almost on a dead level. From San Juan Bautista local steamers and those of the company run to the port of Frontera, about 130 miles distant, where they connect with two lines of Gulf steamers, one running to Veracruz, 36 to 48 hours distant, and calling en route at Coatzacoalcas, the Gulf terminus of the Tehuantepec railway (which, after years of labour and failure, has lately been completed by the Hon. Chandes Stanhope), the other by a branch boat running to Campeche, where it connects with the main line which runs from Veracruz, calling in at this port and via Havannah to New York. It is by this latter route the concentrates from the mine are sent to England.

### Mule Trail and Overland Transport.

The mule trail was a difficult undertaking, but now forms a good road in all kinds of weather. It runs for the greater part of its length along the precipitous slopes of the hills overlooking the Rio de las Sierras, which makes its way as a clear mountain torrent, until debouching on the Tabasco Plains it becomes a muddy, but navigable river. At distances of about 9 miles apart mule stations are established, each with a house for the muleteers, and a long, corrugated, iron-roofed shed to shelter the mules at night. Attached to each of these stations is a corn or maize plantation and "protrero." Twice a day the mules are fed with "sacati," a kind of grass cut up in a chaff machine and mixed with maize. The routine of a day's work is for each muleteer to go out at daylight with his troop of 30 or 40 mules, laden with ore sacks, to the next station, returning with general supplies or goods for the company's store, when the mules are allowed for the rest of the day to forage for themselves. In the afternoon pack-saddles are overhauled, new harness made if required, and "sacati" gathered, and brought in to be cut up for the evening and early morning meals. At sundown the mules are driven in, fed, and stabled for the night. Not more than 250 to 300 lbs., or 10 "arrobas," are usually packed on a mule, the greatest care having to be exercised in order to keep them in good condition. Maize feeding is found to be necessary, the "sacati" being too succulent to have sufficient sustaining power in itself. In these high latitudes the mules, like human beings, are subject to "calenturas" (fevers), especially at the Tabasco end of the road, in addition to which some are occasionally lost by falls over precipices.

### Climate and Temperature.

The climate of the mines is good. The natives alone suffer from "calenturas," or malarial fevers, mostly induced by their careless habits, while the Europeans and Americans have but very mild attacks, which seldom incapacitate them for more than a few hours. On the low plains, or "tierras calientes," the land is extremely fertile, coffee, cocoa, sugar, tobacco, cotton, &c., growing luxuriantly. Around the mine, on the margin of the "tierras calientes," and "tierras templadas," rice, oranges, lemons, sugar, and very fine coffee are grown for local consumption, but owing to cost of transport are not exported. The average maximum temperature is 70° F. for the year, and the average minimum temperature 58° F. The shade temperature is never very high, but, owing to the humidity, is felt to be hotter than is actually the case, and the sun's rays affect one intensely, especially from 9 a.m. until 4 p.m.

### Population and Labour.

Throughout the State of Chiapas the population is very scanty. The "hacendados" find great difficulty in securing labourers, and have lately petitioned the Federal authorities to let them hire the convict labour of the Northern States. What little there is is mostly of a slave character, the custom being to advance a labourer a loan of \$50 to \$70, when by law he or she becomes their creditor's slave until the debt is paid, which in the majority of cases is an impossibility. The "peons" or labourers, are sometimes passed from hand to hand for a small consideration, the debt being paid by the bidder, when the labourer changes his master, and becomes virtually his new employer's slave until such debt be paid. Needless to say the owner, to make matters still more rare, advances "aguardiente" to his peon, well knowing the temptation is too great to refuse, until at last his indebtedness becomes so great that even by the help of friends the case becomes hopeless, and, to all intents and purposes, the men or women remain slaves for the rest of their lives. There is a large Indian population, which is scarcely even in a semi state of civilisation as compared with the Mexican; it is nominally under Government control, but mostly living under the rule of their own caciques, and divided up into many tribes. The Chemula tribe, a fine muscular race, very similar in build to the Kroos of West Africa, let themselves out as hewers of wood, drawers of water, beasts of burden, and carry enormously heavy and bulky loads over trails a European would have to scramble up on his hands and knees—a load of 130 lbs., some 4 feet by 2½ feet by 1 foot in size, being carried on their backs, supported by a thong wrapped round the forehead—with remarkable speed and agility. Such a load is accepted as a regulation weight and size, or minimum load.

Immediately at the mines there is a mixed population, mostly drawn from the towns of Chiapas and San Cristobal, with a few Tabascans, and a good sprinkling of Guenajatos, Michoacans, Guadajarans, the last chiefly criminals hiding away in these wilds. Of Indians there are Chapenecos, Chemulas, and a few Juchetecos, the latter, though in small numbers, being a highly intelligent and independent tribe from the Isthmus of Tehuantepec. The average Jucheteco labourer is above the average Mexican or Mestizo in both intelligence and physique. A large number of the native population are afflicted with a mild kind of leprosy, and are locally called "pintos," or "painted men," the skin being spotted and discoloured, some being pink, white, blue, or black, and in severe cases very unsightly to look at. The majority of workers, when they first arrive, are entirely new to any kind of mining work, due to the fact that no other mine exists in these parts of Mexico, this mine, moreover, being removed from any mining centre by many hundreds of miles. The State of Chiapas itself is but little known or heard of, even in Mexico City, a large portion being marked as deserts—i.e., unknown, and inhabited by Indians, though there are extensive evidences everywhere of there having been a large and dense population during the time of the Spaniards. A high rate of pay and opportunities of acquiring more luxurious habits are the only inducements to work. As a rule the natives do not take kindly to mining work, hence there is always considerable difficulty in securing sufficient miners, though on the whole they show great ability in learning different kinds of work.

### Geological and Physical Features.

The hills being densely clothed in vegetation, inhabited by innumerable insect pests and snakes, with hidden precipices, make them exceedingly difficult to explore, every step having to be hacked out with a machete. With the exception of its flora, the contour of the country reminds one of the Derbyshire Peak District, only on a grander scale. The high peaks of the limestone hills, with their white precipitous sides peeping out from amidst the endless green, are everywhere visible. Along the course of the Rio de las Sierras, the limestone is seen in places resting directly on the igneous rock, which consists largely of syenites, amygdaloidal, and brecciated trap rocks; in other cases it rests unconformably on a succession of slates, shales, and sandstones, which again rest unconformably on the igneous rocks below them. The limestone itself is found in all gradations passing from an ordinary semi-crystalline into a highly crystalline marble.

The mine is approached from the main Rio de las Sierras Valley by a narrow gulch running at right angles to it. At a distance of about a kilometre, the head of the gulch is reached at an elevation of 400 feet above the main valley, where it widens out and breaks up into three smaller ravines; these ravines are separated from each other by two low ranges of hills of igneous origin, and which higher up are lost in the high limestone peaks standing like great sentinels overlooking the mine, while on either side they are bounded by high limestone ranges of hills. In the main gulch the rocks are all of igneous origin. The three ravines are named respectively Danta Creek, a continuation of the main gulch; Pine Creek, the larger and centre ravine; and Copper Creek, the smallest of the three. Danta Creek takes its name from the tapir, being until recently a favourite resort of that animal; Pine Creek, from a cluster of pine trees that overlook it; and Copper Creek, from cuprifera boulders found in it. In the *debocheur* of these three creeks, an old river deposit has been formed, comprising a space of about 1000 feet by 200 feet, and on this the whole of the works and the greater portion of the camp is built. The point of interest, so far as the mine itself is concerned, lies in the junction of these three small ravines, which are, however, of local and insignificant importance as compared with the main and bolder features of the country round. At the head of the gulch, where it commences to widen out, the hard igneous formation abruptly ends, and on the flanks of the limestone ridge of hills, bounding Danta Creek, soft argillaceous schistose rocks are found, containing argentiferous lead ores overlaid by drift. On the opposite side of the valley, on the ridge of hills that separates Pine Creek from Copper Creek, and near the apex of their junction, the ore-bearing limestone is first seen standing out as an irregular line of high white cliffs. This limestone formation runs back for a distance of 170 feet across this ridge, and ends in the perpendicular bluff overlooking Copper Creek to the northward. Tracing this limestone formation southwards, it crosses Pine Creek at the base of the cliffs, and again rises steeply on the opposite side under a heavy bed of decomposed sandy igneous rocks, ending near the centre or backbone of the ridge separating Danta from Pine Creek, where it is found flanked by trap rocks. The formation thus forms an elliptical mass, whose major axis runs nearly north and south, or in the direction just traced; and for a distance of 1000 feet, and with its minor axis running east and west for a distance of about 400 feet, bounded on the south by the Danta Pine ridge of hills, and on the north ending in an abrupt precipice. Pine Creek divides the mine into two parts—the Copper Creek side being called the Santa Fé Mine, and that on the Danta Creek side the Providencia Mine. The cliffs have a frontage to Pine Creek of about 350 feet, and rise above it to a height of between 140 and 200 feet.

The mine is located in this limestone formation, which, in the ordinary acceptance of the word, is not limestone at all, but the mineral wollastonite in a massive form, which, it will be remembered, is the silicate of lime. "Wollastonite," according to Nicol, contains 51.7 silica, 48.3 lime, but with 0 to 2 of magnesia, and 0 to 2 of protoxide of iron. The author is not aware of its having been found in so massive a form in any other part of the world. The general appearance of the deposit, as seen from a distance in the face of the cliffs, is that of ordinary limestone beds. On its north-east boundaries, schistose, garnet, and quartzose rocks are found; to the south-west, limestone rocks, and to the south, trap-rock. Both the schistose and limestone rocks carry traces up to as high as 5 dwts. in gold, and from 3 dwts. to 12 dwts. per ton of silver, and traces of copper. As the outer contact is approached, the wollastonite changes gradually into more of a quartzose nature, where it abruptly ends, but not to the southwards.

### Ore Courses or Ore Channels.

The ore itself is found along certain irregular courses or channels in the limestone, occasionally in solid ribs or in bunches, but more generally disseminated throughout the limestone within these boundaries. These channels of ore can scarcely be said to have anything like a true wall, the only guide being that immediately outside their irregular rough faces to which the ore clings, the wollastonite changes to a pure white snow-like stone. Within their boundaries, garnet is largely associated with the ore; in the Santa Fé Mine it is comparatively free from it, but on the top of the Santa Fé cliffs, and in its Providencia Mine, garnet is largely present, not infrequently entirely displacing the wollastonite matrix of the ore. The wollastonite outside these ore channels is pure and white, but as its outer boundary is approached becomes contaminated with garnet. The metalliferous mineral is argentiferous bornite, carrying with it more or less free gold. Bornite, variegated or purple copper ore, contains Cu 56.6, S 23, and Fe 10.4 per cent. With it are associated grey copper ore,

bornonite, copper pyrites, galena, chrysocolla, azurite, and malachite, the two latter more as incrustations, and usually in the vicinity of what are locally called "blow" or "vent" holes. On the Santa Fé side the bornite is very pure, but on the Providencia side is always more or less associated with some of the above minerals. These "blow" or "vent" holes are irregular hollow chimneys, found in close proximity to the ore channels, and sometimes touching them. Their sides are often formed of a soft sponge-like stone, partially stained with copper and with sides blackened and burnt in appearance, which, owing to its porous and vesicular nature, will float.

When in close proximity to these vent holes, the ore channels are generally impoverished, but 20 to 30 feet away they become very rich. Bornite is often found on the surface, standing out exposed to the weather, and with no signs of change or oxidation beyond its blue colour, a proof, in all probability, of its very recent origin. The ore varies in grade, but taken throughout is of a very even average, running about 3 to 4 per cent. in copper, 6 to 8 ounces in silver, with from 6 to 30 dwts. in gold per ton. Ore of 3.25 per cent. copper, 7 ounces silver, and 12 dwts. gold is looked upon as a good average stone. These ore channels run from a few inches to several feet in width, opening out into chambers and wide vein-like bodies of from 15 to 20 feet, and all more or less continuously connected, notwithstanding the limestone itself being much disturbed and faulted.

### Santa Fé Ore Channels or Courses.

On the Santa Fé portion of the property, inside the base of the cliff on a line with the major axis of the limestone formation, is the ore body known as Taylor No. 3. This ore body forms a central semi-dome-like mass, underneath it and in the southern part of which rises a flat truncated cone-shaped body. Round this cone on two-thirds of its sides and above it the ore has formed itself; a vertical cross section shows it as an elongated crescent. On the top of the cone the ore is from a few inches to a foot thick, but widens out as it sweeps down its sloping surface to 10 and 12 feet, narrowing once more as it approaches the level of the adit level to 4 and 5 feet. It then continues to narrow as the sides of the cone begin to dip with almost perpendicular sides, until at 90 feet below its summit it is only traceable by a thin irregular line, carrying nodules and lumps of bornite. This cone or boss is evidently the apex of a large irregular igneous body that has forced its way up through the limestone. It is found separated immediately from the ore body by a band of ferruginous quartz, which in places passes into agatey quartz; while in others it is entirely absent, the ore resting directly on a dolerite.

Two shafts have been sunk to a depth of 66 feet below the adit, one in the igneous rock formation (the Santa Fé), the other just outside of it (the Taylor). A crosscut at the bottom of each cuts the contact between the two formations, and a level driven for 14 feet along it connects them, tracing the ore for the whole distance, and forming the lower end of the Taylor No. 3 ore body. The ore here was found sometimes as if crushed into the inner or igneous formation, or else in an agatey-like seam forming in the wollastonite 2 or 3 feet away from the contact. A second ore channel runs around the Taylor or central ore body, but is separated from it by a barren belt of wollastonite varying from 10 to 20 feet in width. At one or two points it appears to be connected with the central body. The two form, roughly speaking, in horizontal section, concentric semicircles, whose diameter is the face of the cliff and their centre a peak of igneous rock situated a little within the base of the cliff. Thus one can enter the opening of the Santa Fé ore body on the south-west of the cliff, pass around through the stopes in a semicircle, and come out at its south-east face; entering a third opening, between the two last, pass around the Taylor No. 3 stope, and again come out at a fourth opening in the face of the cliff. The opening of the Santa Fé ore body on the south-west side is by a large chamber some 70 feet by 20 feet, narrowing to a channel of ore running from 5 to 12 feet wide, and some 80 feet in height. The ore at this point starts from near the contact of the two formations, running like a belt round the central body, when it then approaches the contact on the opposite side. Both in depth and height this outer belt-like channel of ore dwindles away and becomes lost in the wollastonite, except in the entrance on the south-west side where it is close to the contact, and appears to have been in immediate contiguity with the central ore body. Not very far removed from this point there is in the western side of the ore channel one of the above-described blow holes, and it would seem to be connected with a similar vent on the surface of the hill above. Although nothing but stains of copper are found in it, yet within a few feet of its exit several hundred tons of rich ore have been extracted, which appear to have had no other connection either in depth or laterally with any other ore body, and forming a blanket-like mass on the top of the cliffs, filling up every hole and corner over which it seems to have flowed. The matrix of this ore is a semi-crystallised wollastonite, heavily charged with garnet grains, being impregnated throughout with rich bornite and small quantities of the carbonate ore. Overlying this mass of ore a rich auriferous gravel was found mostly angular, though with water-worn stones in it, but very limited in extent, covering at the most a few yards in area. A third and more irregular ore body is met with outside the Santa Fé channels in pockets, and much faulted and broken at the outer contact of the wollastonite and garnet schists, which form themselves on the northern side. This, as yet, has not proved sufficiently rich to work, galena forming the bulk of the ore, though bornite is largely present.

(To be continued.)

THE offices of the following companies are closed to-day:—Invicta Gold Mines (Limited), Lydenburg Minerals Exploring Company (Limited), Manica and Mashonaland Exploring Company (Limited), Northern Transvaal Lands Company (Limited), Oceana Transvaal Coal Company (Limited), Transvaal Exploring Company (Limited), Transvaal Lands Company (Limited), Zwartland (Transvaal) Land Company (Limited).

THE directors of the Flagstaff Company (Limited) state that they have received samples from their Star of Colgarde property, which may be seen at the company's office. 10 lbs. of the quartz assayed shows 26 ounces 16 dwts. per ton, and a sample of tailings from a recent crushing gave 8 ounces per ton. The directors point out that these results can only be taken as specimens, although, in their opinion, they indicate the existence of high grade ore in the mine.

THE ALUMINIUM COMPANY (LIMITED) notify that in accordance with the terms of the debentures it is their intention to pay off the whole of the £100,000 issue on October 1.

The share certificates of the HAMPTON LANDS AND RAILWAY SYNDICATE are ready for delivery in exchange for (1) allotment letter; (2) bankers' receipt for amount paid upon application; (3) bankers' receipt for amount paid on allotment.

A dividend of £25,000, being 6d. a share for the month of March, has been declared by the directors of the MOUNT MORGAN GOLD MINING COMPANY.

THE CHAMPION REEF GOLD MINING COMPANY OF INDIA (LIMITED) has declared an interim dividend of 4s. per share (free of income tax), payable on the 1st May. The dividend is on account of profits made for the first four months—to 31st January, 1896—of the company's financial year.

\* A paper read before a recent meeting of the Institution of Mining and Metallurgy.



**C. PASS & SON (Limited), BRISTOL,**  
ARE BUYERS OF  
LEAD ASHES, SULPHATE OF LEAD, LEAD SLAGS,  
ANTIMONIAL LEAD, COPPER MATTE, TIN ASHES, &c.  
and DROSS OR ORES containing  
TIN, COPPER, LEAD, AND ANTIMONY.

**HENRY WIGGIN & CO. (Limited),**  
NICKEL AND COBALT REFINERS,  
MAKERS OF BEST RED LEAD FOR FLINT GLASS  
MANUFACTURERS,  
BIRMINGHAM.

**LAMBERT'S WHARFAGE CO.,**  
PRINCE OF WALES DOCK, SWANSEA.  
Ores, Mattes, Regulus, and Bars received and prepared for market.  
Copper, Lead, Tin, Spelter, and Pig Iron Received, Weighed, and  
Sampled, and Warrants issued against same.  
N.B.—Warrants are on Accepted List of London Metal Exchange.  
Regular lines of steamers from America, Europe, &c.  
Good prices can be obtained for low produce Copper Ores. Send  
fair samples of not less than half a pound.

**THE AUSTRALIAN GOLD RECOVERY**  
**COMPANY (Limited).**  
(MACARTHUR-FORREST PROCESS).

All information and terms regarding Plants and the Licensing of  
this Process can be obtained on application to:

THE AUSTRALIAN GOLD RECOVERY CO. (Ld.),  
23, College Hill, London, E.C.

JAMES R. FOWLER, Esq., 14, King William Street  
Adelaide; or

GORDON WILSON, Esq., The Australian Gold Recovery Com-  
pany (Limited), Charters Towers, North Queensland.

AGENTS FOR THE CASSEL GOLD EXTRACTING COMPANY'S  
MANUFACTURES OF HIGH GRADE CYANIDE.

## COMPANIES AND LEGAL ANNOUNCEMENTS.

\*. Advertisements are inserted in this column at the rate of  
9d. per line, with a minimum charge of 7s. 6d.

**THE CHAMPION REEF GOLD MINING COMPANY**  
**OF INDIA (LIMITED).**

6 and 7, Queen Street Place,  
London, E.C.,  
March 30, 1896.

AT a MEETING of the DIRECTORS of the Company, held to-  
day.

IT WAS RESOLVED—

"That an Interim Dividend of 4s. per Share (free of Income  
Tax) be and is hereby declared, payable on the 1st day of May,  
1896, to the Shareholders on the books of the Company on the  
18th of April, 1896, and that the Transfer Books be closed during  
the said 18th April."

JOHN GARLAND,  
Secretary.

N.B.—The above Dividend is on account of profits made for the  
first four months—to 31st January, 1896—of the Company's financial  
year.

**THE OOREGUM GOLD MINING COMPANY OF**  
**INDIA (LIMITED).**

6 and 7, Queen Street Place,  
London, E.C.,  
31st March, 1896.

AT an ORDINARY GENERAL MEETING of the OOREGUM  
GOLD MINING COMPANY OF INDIA (LIMITED), held  
this day.

IT WAS RESOLVED—

"That a Dividend (free of Income Tax) of 2s. 6d. per Share on  
both Preference and Ordinary Shares be and is hereby declared,  
payable on the 18th day of April, 1896, to the Shareholders on  
the books of the Company on the 2nd April, 1896, and that the  
Transfer Books be closed during the said 2nd April."

JOHN GARLAND,  
Secretary.

**SOCIETY OF ARTS.**—The next course of Cantor Lectures will  
be delivered by Professor Henry A. Miers, M.A., on Monday  
evenings, April 13 and 20, the subject being "Precious Stones."  
The lecturer will deal with—(1) The properties which make  
precious stones esteemed among minerals; (2) the properties  
by which precious stones are recognised; (3) the distinction  
of stones which may be confused, as garnet and ruby, jacinth  
and cinnamon-stone, zircon and lux sapphire, garnet and  
olivine, tourmaline and diopside, &c. The lecture will close  
with some remarks on artificial stones. Mr. James Swinburne  
will deliver a course of Cantor Lectures on "Applied Electro-  
Chemistry," on Monday evenings, April 27, May 4, 11, and 18.  
The papers arranged for the meetings after Easter are—April  
15, "Early English Organ Writers," by Mr. Burnham Horner;  
April 22, "The Perfected Photochromoscope and its Colour  
Photographs," by Mr. F. E. Ives; April 29, "Fruit Drying or  
Evaporation," by Mr. E. W. Badger. Papers at subsequent  
meetings will be read by Captain Abney, on "Ortho-  
chromatic Photography," by Mr. Hudson Maxim, on "High  
Explosives and Smokeless Powders," and by Mr. E. W. Moir,  
on "Tunnelling by Compressed Air."

## DIARY.

Tuesday, April 7

Standard Bank of Africa, Cannon Street Hotel, 1.

Wednesday, April 8.

Great Laxey, Cannon Street Hotel, 12.  
Kimberley Waterworks Company, Cannon Street Hotel, 1.  
Luipaards Vlei, Cannon Street Hotel, 230.

Thursday, April 9.

Australian Gold Recovery, Cannon Street Hotel, 12.  
Transvaal Gold Fields, Cannon Street Hotel, 12.  
Cumberland Lands (Limited), Winchester House, 2.  
North's Navigation Colliery (1889), Ltd., Win. Ho., 3.

## The Mining Journal, RAILWAY AND COMMERCIAL GAZETTE:

An Illustrated Record of Mining, Metallurgical, Railway,  
Financial, Industrial, and Engineering Progress.

ESTABLISHED IN 1835.

THE MINING JOURNAL, RAILWAY AND COMMERCIAL  
GAZETTE, published every SATURDAY MORNING, price  
SIXPENCE, is recognised throughout the World as being the oldest,  
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every quarter of the globe. Its policy is absolutely independent;  
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interest in it held or exercised, by any mine owner, speculator,  
or syndicate; and it is in no way connected with any share-  
dealing agency.

TO CORRESPONDENTS.—Letters on Editorial Matters, or containing  
literary contributions should be addressed to "THE EDITOR." All matter  
intended for insertion must be written on one side of the paper only. The  
return of rejected manuscripts cannot be guaranteed. The Editor invites  
correspondence and items of news or information from readers in all parts  
of the World.

TO SUBSCRIBERS.—The Annual Subscription to THE MINING  
JOURNAL, including postage, is for:—

The United Kingdom, £1 4s.;  
Abroad, £1 8s.;

payable half-yearly in advance. It can be purchased at all Railway Book-  
stalls and Newsagents throughout the United Kingdom for 6d.

TO ADVERTISERS.—The following is an abbreviated Scale of Charges for  
Advertising:—Companies' Prospectuses, £12 12s. per column, or £20  
per page; Companies' or Legal Announcements, 9d. per line, with a Mini-  
mum charge of 7s. 6d.; Sales by Auction, Publications, For Sale, Wanted,  
&c., &c., 6d. per line with a Minimum charge of 4s.  
Displayed (Trade) Advertisements of 2 inches in depth (or more). Single  
Column measure, will be inserted at the following rates:—For 52 inser-  
tions 2s. 6d. per insertion for each inch in depth; for 28 insertions 3s.  
per insertion for each inch in depth; for 13 insertions 3s. 6d. per insertion  
for each inch in depth. Terms for special positions and contracts may be  
had on application.

ADVERTISEMENTS (which should in all cases be sent direct to  
THE BUSINESS MANAGER) can now be received for the forthcoming issue  
of THE MINING JOURNAL, RAILWAY AND COMMERCIAL  
GAZETTE, on FRIDAY, at 15, FINCH LANE, E.C., up till 6 p.m., and  
at 3, DORSET BUILDINGS, SALISBURY SQUARE, E.C. until 9 p.m.

Editorial and Advertisement Offices:

15, FINCH LANE, LONDON, E.C.

Telegraphic and Cablegraphic Address: "TUTWORK, LONDON."  
Codes used: "A.B.C.," "Morning's," and "Universal."

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LONDON: APRIL 4, 1896.

## THE COMPANIES BILL.

THE Companies Bill, which was read a second time on the  
19th of last month in the House of Lords, is to be con-  
sidered in Committee of the whole House after the short  
Easter recess, on the 27th of the present month. Although it  
bears the name of Lord DUDLEY, it is, in fact, the outcome of  
the report of the strong Committee appointed last year at  
the instance of the Board of Trade, with Lord DAVEY as its  
Chairman. In September last, at some length, we noticed  
and drew attention to the salient points of that  
report, and the recommendations of the Com-  
mittee. By some observations let fall by Sir ALBERT  
ROLLIN, in his able presidential address at the annual meeting  
of the London Chamber of Commerce on Monday last, it would  
seem that the Bill is likely to receive wide approval, and meet  
with some measure of success. We are accustomed of late, not-  
withstanding the general criticism to which the constitution of  
the House of Lords is subjected, to look to that assembly for  
the serious measures; or, perhaps, it is more accurate to say  
for those which are likely to become law. It is,  
therefore, the more necessary to pay particular  
attention to the Companies Bill, which, if passed,

will affect a system which has attracted, and is attracting daily  
millions of money, not only of our own, but of other countries,  
for investment in concerns which have their inception in this  
country, and which ensure to the enrichment of the Anglo-  
Saxon race and the extension of the Empire. Lord DUDLEY  
explained in a speech, which drew from his brother peers some  
compliments, that it was proposed that before any company in  
future started business, 5 per cent. at least of the nominal capital  
should be paid up, and of this three-quarters is to be  
paid in cash. As to prospectuses, the object was to reveal,  
as far as possible, to investors the true value of the property to  
which they were asked to subscribe, and the names and dates  
of contracts would have to be stated, as well as their purport  
and effect. Where a director's qualification was held in shares,  
of which he was not the beneficial owner, that fact would have  
to be disclosed. The period within which a meeting must be  
held after the formation of a company is proposed to be  
shortened, and certain statutory powers of inquiry are to be  
given to shareholders to whom full information must also be  
sent several days before the meeting. Other clauses  
for the protection of creditors provide for the regis-  
tration of mortgages within seven days in the office of the  
Registrar of Joint-Stock Companies, where they can be inspected  
on payment of a small fee. Provision in regard to the form  
and publication of balance-sheets, as well as to the audit of  
accounts, are inserted.

So far, then, as the purpose and object of the Bill goes, there  
will be few honest men who will not concur, but care  
must be taken in obtaining these objects that too  
many hindrances are not put in the way of the pro-  
motion of companies, and that the flow of money of the public  
which of late years has set in towards the English joint-stock  
enterprise is not retarded. That money, which forms the sinews  
of war in the development of our colonies and of their mineral  
wealth, has been obtained in a remarkable degree of late years  
by this country, owing to the facilities with which companies  
can be promoted, must not be lost sight of. And again, even if  
this flow is not checked, when you begin to meddle in  
order to cure an evil which has arisen side by  
side with the success of the system which you would  
amend, there is always the danger and the possibility  
that you may turn that which has hitherto flowed in a recog-  
nised and known course into one which is unknown and new,  
and over which you possess no control, and for which your well-  
intended alterations have no use.

Having read the provisions of the new Companies Bill, we are  
inclined to ask, is there no fear of this misfortune happen-  
ing if the company law is tinkered with in the  
direction proposed? We are inclined, after grave  
consideration, to think there is. A system of regis-  
tration of debentures, which shall put companies on equal  
terms to some extent with the ordinary trader who is unable to  
conceal the fact that his business assets are charged by a bill of  
sale from those who trade with him and give him credit, is  
desirable. That the first ordinary general meeting should be  
held sooner than four months after formation, and that infor-  
mation should be available to shareholders; that a restriction  
should be put on going to allotment with a view to liquidation;  
that Section 38 of the Companies Act, 1867, requiring notice to  
be given in the prospectus of every contract, should be made  
intelligible; that prospectuses should be filed with the registrar,  
we readily admit. By all means give shareholders the means of  
obtaining information, and give them the means of securing that  
they shall have men of rectitude and position on their board  
of directors. But amendments to this end may be made in  
Companies Acts without adding the elaborate requirements  
contained in the Bill now before the House of Lords. As an  
illustration of what we point to, let our readers turn to Sec-  
tion 14 of the Bill as to what "every prospectus must state."  
These requirements cover no less than a page and a half of  
printed foolscap in the bare enumeration, and are numbered  
with the 13 letters of the alphabet from A to M inclusive. As  
a further illustration, let us take one of these—say the twelfth  
requirement—which must be stated in the prospectus, and which  
is contained in paragraph L, for instance. It runs as follows:—  
"(L). The dates, parties, and short purport or effect of every  
material contract and every material fact known to any director  
or promoter of the company who is a party to the issue of the  
prospectus, and a reasonable time and place at which any  
material contract, or a copy thereof, may be inspected. Pro-  
vided that this requirement shall not apply to a contract entered  
into in the ordinary course of business carried on, or intended  
to be carried on, by the company, or any contract entered into  
more than five years before the date of publication of the pro-  
spectus."

Let any reader imagine the burden cast upon a director of a  
proposed new company who is called upon by statute to first  
select out of all the contracts and facts known to him which  
are the material contracts and facts to be disclosed, and is then  
to state in detail their purport and effect. If he fails to select the  
contracts and facts which would influence the judgment of a  
prudent investor, and to state both these things in the pro-  
spectus, or any one of the others contained in the twelve other  
paragraphs, numbered A to M, he will be liable to an action for  
compensation, to which he will have no answer unless he can prove  
that he did not know of that contract or fact, and could not dis-  
cover it, or that its omission was due to an honest mistake of  
fact. Will honest men bear such burdens? Our readers must  
answer for themselves. If borne, will they avail the subscriber?  
Again, we must ask for an answer. The prospectus of the  
future will be an enormous budget, which is calculated to crush  
the would-be investor by the colossal character of the facts  
which it must contain. We are tempted to ask was this idea  
present to the draftsman of the Companies Bill of 1896? In  
Sub-section 4 of the section we have been discussing he pro-  
vides:—"This section shall not apply to a circular or notice  
inviting existing members or debenture-holders of a company  
to subscribe for further shares or debentures, but subject, as afore-



said this section shall apply to any prospectus, whether issued on or after the date of the formation of a company or subsequently." In the draft bill, which was appended to the report of the Departmental Committee last autumn, this exception extended also to any circular or notice inviting private subscription only for shares and debentures, and we, at the time, pointed out that such an exception was calculated to encourage the promotion of companies on the vicious private simultaneous system. We are, therefore, glad to see that these words have been omitted from the Bill. The amendment of the draftsman does not, however, go far enough. It is no good providing that the prospectus of companies shall contain information. Nor is it any good to require the prospectus to be filed if companies may be registered, subscribed, and floated, and allowed to carry on business without any prospectus whatever. If the legislation is to be effective, the legislature must provide that no company shall be allowed to carry on business until a prospectus has first been filed, and so prevent the flotation of what are known as non-prospectus companies.

## CITY AND SUBURBAN.

THERE appears to be little prospect of the African mining market displaying any great activity yet awhile. The dullness which has prevailed for so long a time is due to several causes, and until these causes are removed, together with the uneasiness consequent upon them, we need not anticipate any early approach to a boom. The unfortunate thing is that the evils which are now burdening the industry, and which are giving birth to such grave anxiety, will not be cured for weeks to come—indeed, we may say months. Apart from the labour difficulty, and in spite of the assurances of President KRUGER, we cannot be hopeful as to the intentions of the Transvaal Government, and upon the action which they will take vital issues are dependent. All that it is possible to do is to wait and to hope for the best, for until something definite is decided, we cannot place any reliance upon the conflicting statements and rumours constantly flying abroad. It is hopeful to note, however, that in spite of extreme dullness, there is maintained an undercurrent of strength, and thus there is little prospect of a slump. Owners of shares are holding on—and wisely—in expectancy of better times, and others would do well to purchase for a similar object. There is every reason to look forward to an improved condition of affairs; at any rate, this is far more probable than the occurrence of a catastrophe. The present condition of the market, therefore, supplies an excellent opportunity for investors to pick up shares at a low price, and to put them by for the rise which will inevitably take place, or for the dividends which are certain to be paid. Amongst these Cities can be highly recommended, for considering the size of the property, its position, life, and prospects, there is no share cheaper. At the present moment they are a little over par, whilst in the height of the boom last autumn they were £3 higher, a price not regarded as above their intrinsic value. It is true that the company has not passed through so prosperous a year as was anticipated, but the deterrent influence has been the same which has retarded progress in most of the leading mines. It has suffered greatly from the dearth of native labour, and thus no advantage has been reaped from the erection of the additional 80 stamps, from which so much was expected. In July the first 40 out of the 80 were ready, but even so far back as that the manager found it impossible to run all the stamps, through his inability to get an adequate supply of natives. In September, when the remaining 40 stamps were ready, in the place of running the full complement of 210 stamps, the manager, for the same reason, was only able to supply quartz to keep 130 going, whilst from November 10 until the end of the year the working of the other 80 was discontinued. At the recent annual meeting of the company the Chairman laid an indictment against the Government which was certainly justified, and which endorses the general conviction that the latter has neither at heart the interests of the mining industry, nor of the Uitlanders. What is vitally needed is an effective pass system, and to this end representation after representation has been made to the Government, but it has chosen to ignore the seriousness of the position, and has failed to comply with the request. The City and Suburban is no less than 1000 hands short of its full complement of natives, and unless this is remedied shareholders need not look for large profits and dividends. There is also another grave aspect of the situation, and that is the liquor traffic. In consequence of the extreme facility with which the natives can obtain this liquor, they are becoming more and more demoralised, and the less and less work they are able to do. The Chairman gave an illustration of how serious this was. He said:—"We have in our employ about 1600 natives. On an average 375 of these are daily unfit to enter the mine." Far from remedying this evil the Government seem to be exerting themselves to spread it, for, as the Chairman remarked, "notwithstanding our endeavours to remove the facilities for obtaining liquor by natives, the authorities have granted licenses to a number of houses on the western boundary of our property, and in a neighbourhood where it is impossible for the proprietors to make even a bare livelihood, except by the illicit sale of liquor to natives. The scenes occurring at some of these native canteens are at times simply appalling, but, practically, no steps whatever are taken by the authorities to put down this serious evil, with the result that work at the mines is becoming completely disorganised, and the whole industry jeopardised." Then, again, there is the further incubus of unjust taxation, which is a crushing burden upon the industry, and which was one of the chief causes of the political disturbances at the end of last year. These are all evils which we must try our best to get remedied. Fortunately, they can be removed, but only if we let the Government see demonstratively that we are not to be trifled with, and that we shall not rest contented unless we are treated with justice. For instance, there is

the scandalous dynamite monopoly, against which there has been such a violent outcry. The Chairman calculated that the sum paid for this commodity to the Government agent, in excess of the sum they would have expended for the importation of dynamite from Europe, amounted to no less than £20,000, which is equivalent to the 25 per cent. dividend paid last March.

Coming more particularly to the figures and the results of the past year, the profit, in spite of the great difficulties encountered, amounted to £121,686 14s. 8d., out of which two dividends, of 25 and 50 per cent. respectively, were paid in March and June last. Thus it will readily be seen that the anticipations indulged in 12 months ago, as the result of the erection of the extra stamps, have not been realised. A year ago 100 per cent. was the very least one could look forward to, whilst 150 was not beyond the bounds of achievement. Indeed, very great things were fondly imagined, even 200 and 300 per cent. in the near future, when the full complement of stamps had got thoroughly to work. But the obstacles which have arisen since then were not foreseen, and hence no blame can be attached to anyone except, perhaps, to the Transvaal Government. At that time, too, £26—the shares were then £1 each—was not considered too high. Indeed, the shares were looked upon as cheap, considering the company's prospects, and as giving a margin for a much higher figure. To-day the shares stand at a little over £4—which would mean about £17 on the former basis—so that, in spite of the uncertain outlook in the Transvaal, the shares are undoubtedly an excellent investment.

## CONSOLIDATED GOLD FIELDS OF SOUTH AFRICA.

ALTHOUGH the market did not regard with a favourable eye the announcement made public last week that the directors of the Consolidated Gold Fields of South Africa would submit to the shareholders a proposal for materially altering the arrangement under which the managing directors were entitled to 2-15ths of the profits of the company; and although this proposal has been much criticised on all hands, it was not to be anticipated that the shareholders, as a body, when in meeting assembled, would show much opposition to it. Neither did they, for at last Tuesday's meeting the proposal was carried with unanimity. Whether or no the shareholders have done a wise thing—some may still be sceptical—there was nothing else they could do. For our part, we think they have done very wisely indeed, and, therefore, we have pleasure in conveying our congratulations. In the criticism which has been directed against the scheme, the general feeling was that the bargain was too good a one for Messrs. RHODES and RUDD, an opinion in which we do not coincide, and an opinion which, after the statements and arguments delivered at the meeting, very few can continue to hold. As a matter of fact, it is a bargain favourable and advantageous to both sides. Last year, it will be remembered, the company made an enormous profit, the result of a particularly favourable year. Out of this profit Messrs. RUDD and RHODES' share came to no less than £333,333. In the future, if a similar profit is made, this sum will swell the amount to be divided amongst the ordinary shareholders, though, of course, the dividend will be paid upon a larger capital. Under the old arrangement the managing directors could retire from the company on giving three months' notice, when they could immediately claim to be paid over to them in cash 2-15ths of the excess value of the assets over the amount at which they stood in the books of the company. This arrangement might well cause some uneasiness, for the assets of the company have a value largely in excess of the price at which they stand in the books. Therefore, if these gentlemen chose to retire they could place the company in a critical position, for not only would it lose an immense sum of money, but also the services of the gentlemen who have contributed so much to its success. Although, under the new arrangement, they will discontinue to act as managing directors, their services will not be lost to the company, for they will still continue to act as directors, an arrangement greatly to the company's interests. It was thought, also, that Messrs. RHODES and RUDD, not being very sanguine as to the future, were of opinion that "a bird in the hand's worth two in the bush," and consequently made haste to look after themselves. But this falls to the ground in face of their undertaking to look up their shares for four years, contented in the meantime to take part in the dividends. In this manner do they pin their faith to the future of the company, and at the same time win the confidence of the shareholders. At the present market value the £100,000 shares are worth between £1,200,000 and £1,300,000—a considerable sum, but, in the opinion of Messrs. RHODES and RUDD, they will be worth considerably more in four years time. By this arrangement, too, the position of the preference holders is improved; in the words of the Chairman, *infinitely* improved. We cannot do better than quote the powerful reasons which the Chairman gave:—(1) By reason of the managing directors being converted from creditors into ordinary shareholders, their security is increased; (2) as the managing directors' agreement stands now the managing directors rank for their 2-15ths of the net profits before the preference shareholders get their 6 per cent., which priority would disappear under the scheme before you; the position of the preference shareholders is, therefore, improved both in regard to capital and security of interest." Thus, as we have said, neither party is outdoing the other. It will benefit all classes, and the shareholders, convinced of this, did not hesitate to adopt the proposal unanimously. At the meeting the Chairman hazarded the opinion that the future of the company was immense. We hope so. This is, undoubtedly, the general opinion, especially of Messrs. RHODES and RUDD, who are in a favourable position to judge. But that future, unfortunately, is dependent upon contingencies which are peculiarly delicate at the present moment, making prediction bold and hazardous.

## NOTES AND COMMENTS.

AS was to be expected, the speeches of Mr. Malcolm Low and Mr. Edgar Taylor at the annual meeting of the Oregum Company last Tuesday, revealed little beyond what was made public in the annual reports published the week previous. Both gentlemen confined themselves merely to a paraphrase of the statements contained in that document, and to emphasising the hopeful features upon which shareholders may be fairly confident of better results during the current and succeeding years. We quite agree with Mr. Low that with a great mine like the Oregum it is to be expected that the ore will at times deteriorate in quality, and it is as likely as not that later on it will considerably improve. As we pointed out last week, this is a matter, of course, which the directors cannot help. What is in their power is to cope with it by curtailing the expenditure. In this they have been wonderfully successful, and the shareholders have every reason to be thankful to them. In 1894 they worked 4s. 1d. per ton cheaper than in 1893, whilst in 1895 they worked no less than 8s. 4½d. per ton cheaper than in 1894. This is a considerable curtailment. Of course, the great disappointment has been in the bottoms of Wallroth's and Taylor's shafts, which are not looking anything like so well as was to be expected 12 months ago. Nevertheless, as Mr. Taylor pointed out, in Taylor's shaft rapid developments have taken place with most excellent results. Shafts have been sunk 228 feet during the year, whilst since January a further 91 feet have been sunk. The average width of the lode in the shaft the whole distance of 288 feet is 2 feet 10 inches, the ore yielding the excellent assay of 2½ ounces. But, as we were told last week, the lode has pinched a few inches in the last few feet. Mr. Taylor, however, hopes that this will only be temporary. This hope is based upon substantial grounds, as there is a good lode in the 860 south and 760 south. The telegram read at the meeting announced an improvement in the lode in Taylor's shaft, where it had increased to 4 feet wide, the quartz having yielded 19 dwts. to the ton. In fact, the telegram was a most satisfactory and encouraging one, and should go a long way to inspire confidence in the shareholders as to the immediate future of the company. In this connection we might express our opinion that we deem it extremely strange that during the week dullness has been the feature in the Indian market. The reason of this we are at a loss to understand. It may be due, of course, to the approaching Easter holidays, but that is by no means a satisfactory explanation.

LAST week we were constrained to refer to the slump which had taken place in the Kaffir market, consequent upon the darker complexion assumed by affairs in the Transvaal, and we ventured to remark that the last stage of the South African share market was worse than the first. At the time these lines were penned our view was strictly limited to Transvaal questions, and did not include any other factors in the South African section. The Matabele rising, however, which is by this time an historical fact, was soon to follow, and with it the depression over the markets to deepen. There is no occasion to enhance the gravity of the present situation, which, after all, may ultimately resolve itself satisfactorily enough, but while the disturbances are in progress there must inevitably be a great obstacle in the way of mining enterprise. The insurrection comes, too, at a particularly inopportune moment. The market has already adverse influences enough to contend against without this latest disquieting addition, and the downward tendency of the bulk of quotations in the share market was needlessly emphasised. Matabeleland is a young colony, and while the assertion that there are excellent gold-bearing reefs in the locality rests upon very high authority, a period of steady and persistent work is needed for establishing its reputation as a gold field upon a sound and permanent basis. It cannot, therefore, easily brook the considerable delay which must inevitably follow upon the rising now in progress. That the Chartered Company's troops will at a very early period be able to put an end to the disquieting influences now at work among the Matabele hardly admits of serious question. Their past performances in this direction are the best possible testimony that they will continue to operate similarly successfully in the future. In the meanwhile the over-wrought minds of the London speculative fraternity may be all the better for a short rest after the times of excitement that have ruled during the past three months.

It is now a little over 18 months ago since we first drew attention in our editorial columns to the revival of the mining industry of New Zealand, and to the fact, which has lately been so forcibly demonstrated, that if capital were only forthcoming it would result in opening out riches which would astonish the world. Of course, the inflow of that capital immediately awoke to a new and energetic life the abundant resources of the colony, with the result that at the present moment attention is largely concentrated upon the colony's achievements. In this connection, we may as well point out how we have always been the first to draw attention to coming countries, and how, after months have passed, and our predictions have become fully realised, our contemporaries become awake to the fact, and begin to inform their readers of facts which long before were published to the world in our columns. For instance, we were the first to introduce to the public the mining wealth of Western Australia, of British Columbia, of British Guiana, and of Colorado; and of course it is particularly gratifying to us that not only were we the first to do this, but that every statement we have made in connection with any of these fields has been more than verified. As for New Zealand, we have for the last two years published article after article showing the progress made by the industry from time to time, and our readers are well up in the facts, not only of the country's past history, but of its present condition, and there is little more than can possibly be told them. Last week we received from the New Zealand Government the report of the Minister of Mines, the Hon. A. J.



Cadman. Though this report is a very voluminous one, and goes very minutely into all particulars, it does not give information which has not already been laid before our readers. It is merely a detailed history of the accomplishments of the past year. We will, however, publish the introductory statements to this report, an instalment of which appears on another page, as it brings within a concise compass the prominent facts of the past year's progress.

We are really astounded at the accusation made against us by our contemporary, *The South African Mining Journal*. Doubtless our readers will remember that in an editorial on the Transvaal question in our issue of February 8 a printer's error, much to our annoyance, incidentally crept in, "Oom Paul" appearing as "Tom Paul," not a grave mistake certainly, but a most comprehensible one. But our contemporary, who above everybody should know better, retorts that this was done in sheer ignorance, and that we actually did not know the true name of the President of the Transvaal Republic. This, in spite of the fact, too, that over and over again, in previous issues, the name appeared correctly. We will not go so far as to describe this as an insult, but it certainly does not do credit to the intelligence and experience of our contemporary's editorial staff. The article in question, we may casually explain, was written late on Friday night, on the eve of going to press. The compositor set up "Tom Paul," but it was duly corrected in the proof sheet by ourselves and the reader, but in the hurry of going to press the "comp" failed to make the correction in the type, and it was overlooked. That is the explanation, one which our contemporary should certainly understand, as it all comes in the routine of newspaper life. Besides, if our contemporary would only pay a little more attention to the absurd printer's errors which weekly appear in its own columns, it would not be so ready to throw stones at others, and thus publish to the world its own perverse blindness and ignorance. We hope, for our contemporary's own sake—for to everybody else the mistake was clear and comprehensible—that it will not again display such deplorable maliciousness and lack of intelligence.

Mr. J. H. COLLINS, the eminent mining engineer, is exerting himself commendably on behalf of the languishing tin mining industry of Cornwall, and though we are willing to assist him to the extent of our power and influence, we are not sanguine that such efforts, though well directed, will not be well repaid. In a circular drawn up and published by himself he makes a stirring appeal to the charitable feelings of the community on behalf of the distressed miners who have been thrown out of work, owing to the present unfortunate condition of affairs, but we are not hopeful that such an appeal—though soundly based as it is—will meet with the success which it deserves. Still, this gentleman has laudably done his best, and if his efforts result in failure, he may console himself that nothing else can be done—by him. He argues that "it is better to keep mines going through a period of depression than to let them become filled with water, to discharge all the miners, and then to make more or less unnecessary and unremunerative work for those who are thus thrown idle." Already many prominent men have come to the rescue, but they cannot hope to stem the flood of misfortune which threatens to ruin the country. A great deal more assistance is needed, or, in the words of Mr. Collins, "it is still the fact that the great majority of Cornishmen of all ranks afford no assistance to what was once, and still might be, next to agriculture, the chief support of Cornwall. . . . A little support to a struggling mine will often enable the managers to tide over a bad time, and to make discoveries which will be a long-continued source of wealth when the tide turns." Mr. Collins has witnessed several bad times like the present, when judicious action, such as he advocates, has staved off irremediable misfortune, and enabled the industry to benefit greatly as soon as the depression was lifted.

For instance, times of depression afford admirable opportunities to undertake development works underground, "for then," he argues, "so much can be done for so little money, and this without incurring the danger of flooding an already depressed market." He does not advocate the reopening of abandoned mines of any considerable depth, but apart from these "there are still plenty of good and promising situations in which to carry on exploratory works," which stand an excellent chance of recouping with interest the money spent upon them. The introduction of Limited Liability greatly facilitates the carrying on of these works, and minimises, of course, the risk run should the worst come to the worst. "Let it be considered a duty," he says eloquently, "by the patriotic Cornishman, each in the measure of his ability, to purchase and hold a few shares in Cornish mines, and the industry will soon be based so broadly that times of depression can be lived through without serious hardship to anybody." Mr. Collins' appeal and arguments are rendered all the more forcible because he practices what he preaches, and because he is a firm believer that the price of silver must go up and the tin market with it; that the rich tin gravels in the Midway Peninsula must become exhausted, whilst the increased consumption of the metal must also tell before long. To the latter view he is not likely to get many converts, the general opinion being quite the opposite. Besides, people are ready enough to throw away their thousands in "wild-cat" schemes, whereas it would be far better for them to expend a portion to relieve the wants and miseries of their unfortunate countrymen, than to enrich the pockets of knaves and scoundrels. Mr. Collins finally suggests that charitably disposed persons might take up a few full paid-up shares, and distribute them to the miners, who would then become personally interested in making the mine a success. Such is the tenor of Mr. Collins' circular. We are afraid it will appeal in vain. In these days swamps placarded with the word "gold"

are more enchanting than the sweetness and beauty of Charity, and the pockets of the unscrupulous company promoters more alluring and magnetic than the miseries of starving women and children.

But Mr. Collins' efforts do no cease here. He has, furthermore, issued a pamphlet addressed exclusively to the shareholders of Wheal Metal and Flow, of which company he is the Chairman. Our readers do not want to be told that this mine is not meeting with brilliant success; that it does not take a position with the leading mines of Cornwall; and that the public do not look upon it as one foreshadowing wonderful prosperity. On the contrary, it occupies, at the present moment, an humble and comparatively obscure position, but that does not argue that it is not destined in the future to astonish its detractors. Mr. Collins, himself, has great faith in it, and Mr. Collins' opinion is not without its value. The pamphlet in question gives full particulars of the mine, such as a shareholder needs. Its situation is first dealt with, and then its history. Its career has not been one to be despised. Indeed, it has achieved great things in the past, and at a time, too, after heavy losses had been incurred, and the mine was greatly discredited. Indeed, in 1858 the venture was on the point of abandonment. However, a few shareholders went on, and the works were resumed with vigour and success. This does not imply, of course, that history will repeat itself, but Mr. Collins thinks the prospects favour this. At any rate, he says, it is a "pure but good speculation." The italics are the author's. The position of the company is a sound one. Its trifling liabilities are covered many times over by its assets, and as the capital is small, the dividends, in case of a discovery being made, will be proportionately large.

Coke oven products are receiving special attention in the United States just now. At the present time there is under consideration by the Massachusetts Legislature "An Act to Encourage the Manufacture and Sale of Cheap Coke and Gas," which grants Henry M. Whitney the right to erect by-product ovens and to make, convey, and distribute throughout the commonwealth any and "all of the products of coal and of the by-products" incident to the manufacture of coke. The Act has more especial reference to the production of the coke-oven gas at a central point and its distribution by piping to various parts of the State. This Bill has been referred to the Committee on Manufactures of the Legislature, and this week details have reached this side of the evidence given before that body by Mr. Henry M. Whitney and others. The evidence covers the entire question of coking as well as the production, value, and uses of the products of coking, such as coal tar, sulphate of ammonia, and especially coke-oven gas. The character of this coke-oven gas, the feasibility of conveying the same to long distances and its value for power, heating, coking, &c., are thoroughly described. Mr. Whitney is the President of the Dominion Coal Company, in the island of Cape Breton, Nova Scotia. The business of these collieries is now mainly confined to the Dominion of Canada. There they have a business of about 1,000,000 tons a year. The coal is mined and sold mainly in the summer months when navigation up the St. Lawrence is open. During the other six months in the year their plant, their mines, and their labourers are mainly idle. It is for that especial reason that the Dominion Coal Company desires entrance to the markets of New England for its products. The Nova Scotia coal is smoky. It is of a highly volatile character, and for that reason it is not quite as good as some of the coals of the West Virginia region for ordinary uses under the boiler. But it is rich in gas and tar, both valuable by-products. It is, furthermore, rich in ammonia. It contains about 5 lbs. of ammonia for every ton of coal. The company desire to bring their coal from Cape Breton in its raw state, resolve it into its constituent elements of coke and tar and gas and ammonia, and supply them for the various needs of the United States people. The new idea is that the company propose to locate the by-product coke ovens in Boston, Mass., in the centre of a great population, where gas has a high commercial value. These coke ovens are usually located at the mines. There are 6,000,000 tons of anthracite coal used in New England, and 2,000,000 tons of anthracite coal were last year brought into Boston. The total amount of gas used by Boston and several surrounding towns (with a population of 526,000) is 581,000,000 feet—3,000,000,000 cubic feet short of the amount of gas supplied to the City of Manchester, England—a city of 20,000 less people. The expenditure of about 1½ million dollars would cover the expense of holders and mains for supplying these 500,000 people. It is suggested that the various towns should put in their own pipes, and that the company shall sell to the population of the district indicated the ammonia, coke, and gas. All the promoters of the measure ask is the right to reach that population.

Mr. Jos. D. WEEKS, of Pittsburg, Pa., being called as an expert in support of the scheme, stated, in answer to questions by counsel, that he was editor of the *American Manufacturer and Iron World*, of Pittsburg, Pa., that he had been interested in the study of coke and coking for 24 years, having published in that time quite a number of monographs on this subject; that he had had charge at both the Tenth and Eleventh Censuses (1880 and 1890) of the United States of the reports on coke, petroleum, and natural gas; that he had been for 12 years expert of the United States Geological Society on those subjects, and as such had visited England, Belgium, Germany, and France in 1894 and 1895, charged to examine and report upon coking in by-product coke ovens; that he had seen at least 2000 of these coke ovens in operation; that he had been secretary of the Board of Judges, Department of Mines, Mining, and Metallurgy of the World's Columbian Exposition, and that he had just completed a turn as President of the American Institute of Mining Engineers. Mr. Weeks gave a detailed scientific statement with regard to coke and its manufacture, describing the different European

coking systems at great length. He maintained the feasibility both from a commercial and a practical standpoint of transmitting this coke gas from a central station at or near the coke ovens for a distance of 20 or 30 miles, or even more, and also the feasibility of enriching the gas, at the several points of consumption, by means of a small enriching plant, so as to make it suitable for illumination. To-day natural gas, he said, was being distributed through some 60,000,000 feet of pipe, ranging in size from ½ inch in diameter to 36 inches, and this did not include, as a rule, any pipe in houses, but only the mains and the service pipes from these mains to the owners' property line, all but about 1,000,000 feet of this being 1 inch and upwards. For several years most of the natural gas used, not only in Pittsburg, but at all points of consumption at any distance from the wells had been pumped. Millions of cubic feet of gas were pumped in this way every day in the year. The compressors of the Norwalk Ironworks alone were pumping 75,000,000 cubic feet a day. The value of coke gas for power and manufacturing purposes was also dwelt upon by Mr. Weeks, and the possibility it afforded of reinstating Massachusetts in a position of celebrity as regards iron and steel manufacture. He anticipated no difficulty with regard to long distance transmission, since natural gas was pumped 116 miles in the Pittsburg district, and coke oven gas could be piped just as readily.

## THE MINING MARKET.

WEDNESDAY EVENING.

Kaffirs affected by the news from Matabeleland.—West Australians stronger with a widening market.

THE four days which have elapsed since we last chronicled the doings in the Mining Market have been less devoid of incident than the preceding two or three weeks. The approach of the Easter holidays, however, and the closing of the Stock Exchange for four consecutive days, have naturally restricted dealings, and on balance there is not a great deal of alteration in prices to record. On Saturday Kaffirs were dull on the first reports of the Matabele rising. The West Australian market maintained the firmness by which it was characterised during the preceding week, but business in all sections was on a small scale, the rival attractions of the University Boat Race accounting for the absence of many members, in spite of the unpromising weather. The Kaffir Circus opened flat on Monday morning, on the fresh developments in Rhodesia, and the market continued dull throughout the day. There was less doing in West Australians, though prices were higher in many cases. No attempt was made to galvanise the Miscellaneous department, in which transactions were on a very small scale. On Tuesday there was little excitement in Chartered, the effect of sales based on the disquieting accounts from Bulawayo being checked by the covering purchases of operators anxious to get their books even before Easter. The Consolidated Gold Fields meeting passed off satisfactorily, and the price of the Deferred shares improved temporarily, but towards the close an uneasy feeling manifested itself throughout the market, and in the Street things were flat, almost without exception. The West Australian market, on the other hand, maintained its strength, and further rises were established. Indians and New Zealanders were inactive. This morning Africans, under the lead of Chartered, open dull on Mr. Chamberlain's overnight statement in the House of Commons. There was a rally at mid-day on bear closing, but prices broke again towards the close. The report that the telegraph wires between Rhodesia and the Cape had been cut was made the most of as a bear point, whilst the rumour as to the dispatch of British troops was accepted as an indication of more trouble to come. The question of the cost of such an expedition also came up for discussion, and people arrived at the conclusion that whatever happened was not likely to make things any better for the Chartered Company. In the Westralian market Goldfields took a decided lead, but changes in others were slightly irregular. There was next to nothing doing in Miscellaneous.

### South Africans.

Dealings in Chartered have represented an unusually large proportion of the business in the Kaffir market. The fluctuations to-day have been incessant, for whilst the shares were at one time no better than 3½, they had a strong rally to 4½, only to relapse to 4¼, which leaves them ½ down on balance. The shareholders' meeting on Tuesday passed the resolution for the increase of the capital of the Consolidated Goldfields without a dissentient, and as the Chairman spoke of the immediate declaration of a 10s. dividend, the Deferred shares hardened to 12½. They close, however, unchanged on balance at 12½. The Preferred shares are maintained at 25s. As was pointed out at the meeting, the position of the shares will be improved by the transfer of the managing directors from the position of creditors to that of partners. Gold Trusts have lost ¼ at 7½, and Gold Fields Deep ¼ at 8½. Rhodesian properties generally are weaker on the Matabele rising. Rhodesia Exploring have shed ¼ at 6½, but Willoughby Consols at 1½, Mozambique at 1½, Mashonaland Agency at 2½, Hendersons at 2½, and Bechuanaalands at 1½, are all the worse by small fractions. In the Barnato Group Ginsberg and Barnato Consols are exceptionally ½ higher at 1½ and 3½ respectively, but other changes are in the downward direction. Buffels have lost ½ at 3½, Kimberley Rodeoport ¼ at 2½, New Primrose ¼ at 5½, and Spea Bons ¼ at 1½. In the Robinson Group the Banks have lost ¼ at 6½, and Block B ¼ at 1½, whilst Langlaagte at 5½, and Randfontein at 2½, are on Friday's mark. The East Rand Group is rather better, East Rands at 6½, Comets at 2½, St. Angelo at 4½, and Anglo-French at 4½. Rand mines are maintained at 2½. Nourse Deeps have fallen ¼ to 4½, whilst Rodeoport Deeps are ¼ up at 3½. In the Eckstein Group Henry Nourse has put on ¼ at 6½ and Modders ¼ at 9½, whilst Ferreira is ¼ down at 18½. Bantje has risen ¼ to 3½, and Crown Reef ¼ to 10½, but Knights are quoted ex rights at 5½, which leaves them without material alteration. Shebas have improved ½ to 2½, but most other changes are in the downward direction, Meyer and Charlton having declined to 5½, Orion to 2½, Transvaal Gold to 5½, Van Ryn to 5½, and Wellbutter to 7½. The small Lydenburg shares are generally easier, Balkis at 5s. 9d., Graskop at 5s., Lishons at 6s. 9d., and Spitzkops at 14s. 6d. Diamond shares have shown a better tone. De Beers have scored ¼ at 27½, and Jagers ¼ at 10½.

### West Australians.

The most important gain in this section is the ½ scored by Goldfields at 7½. Day after day influential purchasers have



been at work, and there appears to be every prospect of the upward movement being carried still further. Hampton Plains, in which the same financiers are interested, have put on  $\frac{1}{2}$  at  $\frac{1}{2}$ . In the Hannan's Group Boulders have improved  $\frac{1}{2}$  to  $\frac{3}{4}$ , but the chief excitement has been in Lady Loch, which closed  $\frac{1}{2}$  higher at  $\frac{3}{4}$ . Brownhills have shed  $\frac{1}{2}$  at  $\frac{1}{2}$ , Lake View  $\frac{1}{2}$  at  $\frac{3}{4}$ , and Associated  $\frac{1}{2}$  at  $\frac{1}{2}$ , sales of the last named being pressed on account of holders in the Oolgardie Syndicate, amongst whom 100,000 shares are now being distributed in respect of the original flotation of the company. Hannan's Oroya have put on  $\frac{1}{2}$  at  $\frac{1}{2}$ , and a similar gain is shown in Proprietary at  $\frac{1}{2}$ , and in Golden Horseshoe and Iron King both at  $\frac{1}{2}$ . Increased attention has been devoted to the Menzies Group, though there has been some reaction from the best. Reefs were over 2 on Monday, but close only  $\frac{1}{2}$  higher at  $\frac{1}{2}$ . Mining and Exploring have put on  $\frac{1}{2}$  at  $\frac{1}{2}$ , and Gold Estates and Consols  $\frac{1}{2}$  each at  $\frac{1}{2}$  and  $\frac{1}{2}$ . In the White Feather Group, Ejudina has been prominent, closing  $\frac{1}{2}$  to the good at  $\frac{1}{2}$ . Colonial Finance has improved  $\frac{1}{2}$  to  $\frac{1}{2}$  xd. Mainland Consols have risen  $\frac{1}{2}$  to 3, Fingall's Reefs  $\frac{1}{2}$  to  $\frac{1}{2}$ , and Golden Crown  $\frac{1}{2}$  to 2.

#### Miscellaneous.

As indicated in the opening, there has been practically nothing doing in Indians or New Zealanders. Nundydooogs at  $\frac{1}{2}$ , Ooregums at  $\frac{1}{2}$ , and Champion reefs at  $\frac{1}{2}$  are the turn easier, whilst Mysore is maintained at  $\frac{1}{2}$ . Waiki at 6, Waitekauri at  $\frac{1}{2}$ , Consolidated Gold Fields of New Zealand at  $\frac{1}{2}$ , are all  $\frac{1}{2}$  down. The only quotable changes in Charters Towers varieties are a drop of  $\frac{1}{2}$  in Mills Day Dawn at  $\frac{1}{2}$ , and a gain of a like amount in Bonnie Dundee at 6s. 9d. Copper shares are irregular. Times have put on  $\frac{1}{2}$  at  $\frac{1}{2}$ . Tharsis at  $\frac{1}{2}$  and Mason and Barry at  $\frac{1}{2}$ , are unaltered, whilst Anaconda at  $\frac{1}{2}$ , Capes at  $\frac{1}{2}$ , and Copiapo at  $\frac{1}{2}$ , are all the turn easier. Broken Hills are firm at  $\frac{1}{2}$  xd., whilst British have put on 6d. at  $\frac{1}{2}$ . There are no changes worth reporting in the more strictly Miscellaneous shares, business having been quite at a standstill.

#### STOCK EXCHANGE SETTLING DAYS.

##### CONSOLS.

Wednesday, May 6.

##### MINING MAKING-UP DAYS:

Saturday, April 11 | Saturday, April 25

##### MINING NAME DAYS:

Monday, April 13 | Monday, April 27

##### ACCOUNT DAYS:

Wednesday, April 15 | Wednesday, April 29

#### INSTITUTION OF MINING AND METALLURGY.

At a meeting of the Institution of Mining and Metallurgy, held at the Geological Museum, Jernyn-street, S.W., on Wednesday last, Mr. JAMES MACTEAR (vice-President) in the chair, the following paper was communicated by Mr. CLAUDE VAUTIN (member of Council):—

##### "Notes on the Cripple Creek Gold Fields, Colorado, U.S.A."

**Situation.**—The Cripple Creek Gold Fields are situated in El Paso Co., Colorado, 70 miles south-west of Denver, and 20 miles west of Colorado Springs. The district is comprised in an area of about 140 square miles, though mining operations have been confined to only about 50 square miles. The general elevation is over 9000 feet above sea level.

**Geological Features.**—The country rock consists almost entirely of granite and gneiss, penetrated by numerous dykes and phonolite, basalt, and diabase. In the centre of the district, where the gold deposits are most numerous and productive, occurs andesitic breccia and tuff, mostly decomposed, which has been described as a typical volcanic complex. The gold occurs both in vein and placer deposits, though the bulk of the supply has been obtained from veins, the general occurrence of which is in fissures in the country rock. The vein matter consists of quartz, fluorapatite, feldspar, iron oxides, pyrites, &c., and the gold is not evenly distributed throughout the ore bodies, but is concentrated into veins, pipes, and chutes of varying size and continuity, being at times from 1 inch to several feet in width and running to several hundreds of feet in length.

The gold occurs in a free state and in combination with tellurium, and is occasionally found associated with iron pyrites; the general occurrence, however, is as telluride.

**Treatment of the Ore.**—The greater portion of the ore obtained is sent to the smelters at Denver or Pueblo by rail, while the lower grade ores are treated by cyanide and chlorination at the local works.

**Output.**—The output for last year (1895) has been estimated at about 180,000 tons, yielding on an average 2½ ounces to the ton, though it is on the lower grade ores that the future of the district ultimately depends, and in this connection an interesting comparison can be made with the Rand Mines, the average yield of which is about 13 dwts. to the ton.

The following table may prove of interest as showing the first stages of development at Cripple Creek with other mining districts:—

	Witwatersrand.	West Australia.	Cripple Creek.
Ounces.	Ounces.	Ounces.	Ounces.
1st year .. 1886	—	1887 4,873	1892 30,000
2nd " .. 1887	25,149	1888 3,493	1893 125,000
3rd " .. 1888	208,121	1889 15,492	1894 200,000
4th " .. 1889	369,557	1890 22,806	1895 400,000

The above notes are of the most cursory character, and the principal object in submitting them to the consideration of the members of the Institution is to elicit in the form of a discussion further information regarding a field that is comparatively unknown in this country, and to promote these interests, we are all pledged to serve—namely, the advancement of the mining and metallurgical industries.

The author trusts in a short time to place further information before the members based upon the results of a personal visit to these gold fields.

At the conclusion of the reading of Mr. Vautin's paper, Mr. F. M. ENGLISH (of Colorado) contributed some valuable information regarding the mineral resources of the State.

An interesting discussion followed, in which Mr. A. E. WALTON, F.R.S., &c., who has lately returned from Cripple Creek, said that Cripple Creek was in his opinion one of the finest gold camps in the world. The majority of the mines had been opened and developed by miners with little or no capital, who had since paid enormous royalties of from 20 to 40 per cent., and yet made money. In conclusion, he said he was convinced that Cripple Creek would make its mark as one of the principal gold producing centres of the world.

Mr. WALTER McDERMOTT, M.Inst.M.M. and others having spoken, the proceedings terminated.

## CORRESPONDENCE.

*We wish it to be understood that we do not hold ourselves responsible for, and do not necessarily endorse, the opinions of correspondents. All communications must be accompanied by the names and addresses of the senders, though these need not necessarily be published.*

### CRIPPLE CREEK GOLD MINES.

TO THE EDITOR OF "THE MINING JOURNAL."

DEAR SIR,—A demand is springing up for sound gold mines in this district that are well reported upon by reliable and independent engineers, and although there are many mines now working at a large profit, still there are numerous veins that have not been tested owing to the want of working capital. It is, therefore, absurd to suppose that only the poor mines are sent here for flotation. One mine lately sent over has 20 veins proved on the surface of a hill, and capital is required to drive a tunnel from the base of the hill, so as to cut the veins at a depth of about 500 feet, thus obviating the necessary expense of pumping and winding machinery. The mouth of this tunnel will be close to the railway, so that the ore can be tipped into the railway wagons and sent direct to the smelters. It is proposed to drive this tunnel at least 3000 feet across the veins, and although 20 veins are known to exist, only about 1-10th of the surface has been prospected, consequently many other veins are sure to be intersected. Throughout this gold district the veins increase in value as depth is attained, and veins that produce 2 ounces of gold per ton on the surface, at a depth of 400 to 500 feet produce 12 ounces gold per ton. Of course, picked samples can be found to assay at the rate of many hundred ounces per ton; but what we look to is the result from the smelters of the ore in bulk.—Yours faithfully,

JOHN L. M. FRASER,  
Consulting Mining Engineer.

162, Ebury-street, London.

## MINING IN CORNWALL

### AND DEVON:

#### NOTES ON MINING IN THE WEST.

(FROM OUR SPECIAL CORRESPONDENT.)

THE past week has been entirely barren of incident in mining affairs, and the gossips will probably have to wait until the two or three approaching meetings have been held to find material for discussion. It is satisfactory to find that things are no worse in Cornwall than they were a few weeks ago, and that outside people, as well as those inside the county, are still indisposed to take anything like a gloomy view of the situation. The more sanguine point to the progressive policy at Dolcoath and Wheal Bassett as sufficient justification for their opinions of the future, and some do not hesitate to say that even if all the other mines closed, the success of these two in a few years would be such that the latter condition of the industry would be very much better than the former, because capitalists would be satisfied with the probabilities of a good financial return for a progressive policy, and would readily open up the mines. Certain it is that people generally are much less pessimistic as to the future than the apparent circumstances might seem to warrant, and it is upon this determination and perseverance in helping a struggling industry over a difficulty that even its existence now is dependent. The mines are, unfortunately, fewer in number than they were, and it is not altogether a misfortune that circumstances which were considered untoward necessitated the stoppage of some, because the shareholders' pockets had been so long drawn upon, that in the attempt which would have been made to keep the lot going, it is quite likely that the whole would have fallen. As it is, several are merely in a state of suspension, and on any favourable outlook money would be forthcoming to put them on their legs again.

ONE of the most obvious of these cases is that of West Frances, a mine which but for the relinquishment by Mr. Williams, and some smaller shareholders, would have been continued for a very long time. Our strong opinion is that the executive will do well to take things quietly, and on the first opportunity consult the shareholders as to the desirability of re-starting. It is a fine sett, situated between two such properties as Wheal Grenville and the Bassett Mines (Limited), and if converted into a Limited company with a good working capital sufficient to develop the property it is undoubtedly one of the best in the district. To split the sett up, and part with it for a mere song, is scarcely fair, and with the financial influence which Mr. C. V. Thomas ought to have gained by this time after his negotiations in respect to Dolcoath and Carn Brea, it might be worth while trying to get a little outside capital. The present shareholders would probably be willing to take up a proportionate part on the understanding that the liability was limited, and that the money would be called up in easy instalments.

THE pursuer of Wheal Agar has been fined £1 and costs as the result of the prosecution initiated by Mr. Strauss for his failure to convene an ordinary meeting of shareholders. Mr. Bawden has now summoned a "special" meeting, but the matters which are placed on the agenda give quite scope enough for the raising of the whole question of the policy of the executive. The delay in calling the meeting may, however, not be without the effect which may have been desired, for the probability is that in the meantime some shareholders who had supported Mr. Strauss may have relinquished, and a majority may thus be converted into a minority. We know that one large shareholder has relinquished.

A NEW mining venture is announced at St. Just in Penwith. It is on a small scale, but it is encouraging to hear of any fresh enterprise, however modest, in these times of depression. The capital is being furnished by some patriotic sons of St. Just who have made money abroad, and the management has been entrusted to Captain Tregear, who had charge of the underground operations at Wheal Owles at the time of the terrible disaster which brought the career of that once celebrated mine to such a sudden and calamitous close. The ground now being worked is situated in Kemdack Bottoms, near the sett known as Wheal Crennell. An engine has been purchased and set to work, and the water is being pumped out. In the same parish a small sett is being worked by Mr. James Chemhalls, which is said to be looking very "kindly."

MR. STRAUSS' Bill, the object of which is to enforce arbitration in controversial matters relating to mines, is "only a little one,"

but it is to be feared that its chances of passing are small. This is the more to be regretted, as the present East Pool-Wheal Agar deadlock shows the necessity that exists for legislation dealing thoroughly with the question. It is not likely, however, that anything will be done unless the Government can be induced to give attention to the matter.

## THE METAL MARKETS.

### LONDON METAL MARKET.

THE METAL MARKET, LONDON, APRIL 2.

#### Copper.

THE copper market this week has tended upwards, and there has been a steady improvement day by day. The main cause of this is doubtless the fact that statistics show the position of the article to be increasingly sound, the figures for end of March showing a decrease for that month over 3500 tons. This consideration has more than counteracted the effect of the financial weakness in America. The G.M.B. market opened at £44 12s. 6d. s.c. on Monday, and after £44 11s. 3d. had been done, this position at once rose to £44 13s. 9d., whilst three months was done at £44 18s. 9d. to £45. On Tuesday s.c. was dealt in at £44 17s. 6d. and £44 16s. 3d., and three months at £45 1s. 3d. to £45 3s. 9d. Wednesday brought an improvement to £45 1s. 3d. and £45 5s., respectively, the scarcity of cash G.M.B.'s being reflected in the increasing margin obtainable for three months. On Thursday morning, £45 2s. 6d. was paid for a short date, and £45 7s. 6d. and £45 6s. 3d. for three months, the market closing firm at £45 2s. 6d. s.c., and £45 7s. 6d. three months. The transactions for the four days averaged about 1000 tons daily.

#### Tin

has been, on the whole, a dull market; Straits tin opened at £60 5s. cash, and improved to £60 13s. 9d., which was paid on Wednesday, three months improving during the three days from £61 to £61 6s. 3d. Sellers slightly predominating during the remainder of the business week, and demand being dull, a relapse ensued, and the market closed on Thursday morning at £60 5s. to £60 7s. 6d. cash, and 61d. three months. Billiton tin improved from 36½d. s.c. to 36½d., and from 36½d. three months to 36½d., whilst Banca closed at 37½d.

#### Pig Iron

has been somewhat irregular this week, but the outside range of the fluctuations has not been large, and the close is at the opening price—viz., 46s. 8½d. s.c., Scotch buyers. In the interval business was done at down to 46s. 7½d., and up to 46s. 10d. Hematite closes at 48s. 4d., and Middlesbrough at 38s. 3½d.

#### Lead

is almost without demand, and closes dull at £11 1s. 3d. to £11 2s. 6d. soft foreign, and £11 5s. to £11 6s. 3d. English.

#### Spelter.

The firmness of this article continues, and values close very steady at £15 10s. to £15 12s. 6d. ordinaries, and £15 12s. 6d. to £15 15s. specials.

#### Antimony

is quiet but steady at £30.

#### Quicksilver

is quiet at £6 17s. 6d. firsts, and £6 16s. 6d.

The following are to-night's (April 2) prices of metals:—

	Copper.	£ s. d.	£ s. d.
Tough cake and ingot	...	43 10 0	49 0 0
Best selected	...	49 10 0	50 0 0
Electrolytic Copper	...	52 12 6	51 12 6
Sheets and sheathing	...	...	56 0 0
Flat bottoms	...	...	59 0 0
Chill bars	...	...	45 7 6
Good merchantable, spot, & 3 months respectively	...	45 2 6	45 7 6
Copper tubes, seamless	...	...	0 0 7½
	Alloys.		
BRASS: Wire	...	...	0 0 5½
" Tubes (solid drawn)	...	...	0 0 6½
" Sheets	...	...	0 0 6
PROSPER BRONZE: Alloys II.	...	...	79 0 0
" " III. or	...	...	81 0 0
" " (in Holland)	...	...	79 0 0
" " XI.	...	...	72 0 0
" Vulcan brand Al	...	...	72 0 0
DELTAL METAL	...	...	72 0 0
BULL'S METAL	...	...	65 0 0
	Ferrobronze (Vivian's).		
Ingots	...	0 0 5½	...
Ordinary sheets, plates, bolts and bars	...	0 0 6½	...
Screw bolts and nuts	...	0 0 8½	...
Pump rods, plain	...	0 0 7½	...
" finished	...	0 0 10½	...
DELTA METAL No. 4 (per ton)	...	...	...
" Sheets and plates (per lb.)	...	...	...
" Bars, round, square, flat (per lb.)	...	...	...
" hexagon (per lb.)	...	...	...
	Tin.		
English, ingots, f.o.b.	...	64 5 0	64 10 0
" bars	...	65 5 0	65 10 0
" refined	...	66 5 0	66 10 0
Straits, spot and 3 months respectively	...	60 7 6	61 0 0
Australian spot, and three months respectively	...	61 2 6	61 15 0
Banca " (in Holland)	...	68 1 6	68 1 6
TIN PLATES: Charcoal, best quality	...	0 14 0	0 17 6
" " ordinary	...	0 10 9	0 13 8
" Coke, best quality	...	0 9 6	0 9 9
" " ordinary	...	0 9 0	0 9 3
These prices of tinplates are f.o.b. at Swansea; at Liverpool 5d. per box more.			
	Iron.		
Pig, G.M.B., f.o.b., Clyde, spot	...	...	2 6 8½
" Scotch pig, No. 1 Gartsherrie	...	...	2 11 0
" " Clyde	...	...	2 13 6
" " Gowan	...	...	2 10 0
Bara, Welsh, f.o.b. Wales	...	...	5 9 0
Plates	...	...	6 5 0
Bars, Staffordshire, at works	...	...	5 5 0
Sheets	...	...	6 12 6
Plates	...	...	6 7 6
Hoops	...	...	5 15 0
Ship plates, Middlesbrough	...	...	5 13 0
STEEL: English spring	...	...	10 6 0
" cast	...	...	42 0 0
" Rails at works, according to section	...	...	3 0 0
	Lead.		
Spanish or soft foreign	...	11 1 3	11 2 6
English pig, common	...	11 5 0	11 6 3
" L.B.	...	...	11 12 6
" sheet and bar lead	...	...	12 8 0
" pipe	...	...	12 15 0
" red	...	...	14 10 0
" white	...	...	17 10 0
" patent shot	...	...	15 0 0
	Spelter.		
Silesian ordinary brands	...	15 10 0	15 12 6
" special brands	...	15 12 6	15 15 0
English Swansea	...	...	16 5 0
Sheet Zinc	...	18 10 0	18 15 0
	Antimony.		
Antimony	...	...	30 0 0
	Quicksilver.		
Flasks, 75 lbs. warrants	...	6 16 6	6 17 6
Ore, c.i.f., U.K. ports	...	...	...
1st quality, 50 per cent. and upwards	...	0 0 11	0 1 1
2nd " 47 per cent. to 50 per cent.	...	0 0 10	0 1 0
3rd " 40 " 47 per cent.	...	0 0 9	0 0 11
	Aluminium.		
98-99½ per cent. (guaranteed 99 per cent. min.) in	...	Per lb.	Per lb.
Ingots (1 cwt. lots)	...	...	0 1 6
do do (1 ton lots)	...	...	0 1 4½
	Nickel.		
99-99½ per cent. guarantee	...	0 12	0 1 6

One hundred tons of ore belonging to the Isle of Man Mining Company (Limited) was sold on Saturday at £8 11s. per ton.



# "THE MINING JOURNAL" SHARE LIST.

ABBREVIATIONS AND REFERENCES.—The following are the significations of the abbreviations and references which occur in the Share List:—A, Antimony; As, Arsenic; B, Blende; Bx, Borax; C, Copper; D, Diamond; G, Gold; I, Iron; L, Lead; M, Manganese; N, Nitrate; P, Phosphate; Q, Quicksilver; R, Ruby; S, Silver; S-L, Silver-lead; Sul, Sulphur; T, Tin; and Z, Zinc. \* In the "Amount of Share" column of British Mines signifies that the mine is conducted on "Cost Book" principles; † in the "Head Office" column of African Mines signifies that the address given is not that of the head office, but of a sub, or transfer office; and ‡, following the names of African Mines, signifies that they are subject to the Limited Liability Law of the South African Republic.

\* The following is by far the most complete and comprehensive list of mines, in whose shares business is being currently transacted, published. Additions will be made from time to time as occasion requires. Every effort is made to ensure accuracy, and Secretaries of Companies, Share Dealers, and our readers generally, are cordially invited to co-operate with us to this end, by notifying us of any errors that may at any time occur. We desire it to be understood that, while our Share List will almost invariably be found correct, we do not hold ourselves responsible for any loss or inconvenience that may arise from possible inaccuracies.

## AFRICAN MINES.

Name.	Closing Price, Apr. 1, 1896.	Closing Price Mar. 27, 1896.	Am't. of Share	When last X'd and Dividend.	Called up Per Share.	Amount of Stock or No. of Shares Issued.	Situation of Mine.	Head Office.
Abbott's Con. Reefs	1/4 3/4	1/4 3/4	1 0	—	—	1 0	De Kaap	Broad Street Avenue
Alders Consolidated	1 1/4	1 1/4	1 0	—	—	1 0	—	1, Moorgate place.
African Estates	2 3/4	2 3/4	1 0	2/4 rts Oct. 1895	—	1 0	—	3, Copthall-buildings
Gold Revy.	1 1/4	1 1/4	1 0	—	—	1 0	—	23, College Hill.
Africans	1 1/4	1 1/4	1 0	—	—	1 0	—	3, Clement's lane
Africans	1 1/4	1 1/4	1 0	—	—	1 0	—	23, College Hill
Alexandra Estate	1 1/4	1 1/4	1 0	—	—	1 0	—	18, George street
Anglo-French Exp.	1 1/4	1 1/4	1 0	15% Aug 29 '95	—	1 0	—	2, Princes street
Matabeleland	1 1/4	1 1/4	1 0	—	—	1 0	—	Winchester House.
Apantoo	1 1/4	1 1/4	1 0	—	—	1 0	—	Dashwood House.
Aurora	1 1/4	1 1/4	1 0	5% Mar. '93	—	1 0	—	8, Old Jewry.
West United	1 1/4	1 1/4	1 0	—	—	1 0	—	7, Lothbury
Austral-African	1 1/4	1 1/4	1 0	3/- Dec. 1895	—	1 0	—	Token Ho., Ophthal.
Baika Estating Co.	2/9 3/4	2/9 3/4	1 0	—	—	1 0	—	85, Gracechurch-st.
Land	5/9 6/3	5/9 6/3	1 0	1/ Feb. 13 '96	—	1 0	—	15, Geo. St., Mn Ho.
Bantjes Consol	3/4 3/4	3/4 3/4	1 0	1/ Feb. 24 '95	—	1 0	—	7, Lothbury
Barnato Bank	1 1/4	1 1/4	1 0	—	—	1 0	—	17, Basinghall-street
Consol	3 3/4	3 3/4	1 0	—	—	1 0	—	12, St. Swithin's-lane
Barrett	11/3 11/9	11/3 11/9	1 0	—	—	1 0	—	72, Basinghall street
Bechuanaland Exp.	11/3 11/9	11/3 11/9	1 0	—	—	1 0	—	2, Austin Friars.
Ben Trado	1 1/4	1 1/4	1 0	—	—	1 0	—	8, Princes-st., E.C.
Big Golden Quarry	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Black "B" Lang.	1 1/4	1 1/4	1 0	—	—	1 0	—	15, St. Swithin's-lane
Bonanza	1 1/4	1 1/4	1 0	—	—	1 0	—	7, Lothbury
Brit. S. A. Char.	1 1/4	1 1/4	1 0	—	—	1 0	—	8, Old Jewry
Buffelsdoorn	1 1/4	1 1/4	1 0	—	—	1 0	—	Warford Court
Central	1 1/4	1 1/4	1 0	—	—	1 0	—	19, St. Swithin's-lane
Consolidated	1 1/4	1 1/4	1 0	—	—	1 0	—	9, Queen-street-place.
Cape Asbestos	1 1/4	1 1/4	1 0	—	—	1 0	—	99, Cannon-street.
Copper	1 1/4	1 1/4	1 0	—	—	1 0	—	Palmerston Bldgs
C. S. Pref.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Cassell Coal	1 1/4	1 1/4	1 0	—	—	1 0	—	19, St. Swithin's-lane
Can. de Kaap	1 1/4	1 1/4	1 0	—	—	1 0	—	Winchester Ho.
Roodp's Deep	1 1/4	1 1/4	1 0	—	—	1 0	—	62, Lombard-street
Champ d'Or	1 1/4	1 1/4	1 0	—	—	1 0	—	30, St. Swithin's-lane
Charterland G.F.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Chimes West	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
City and Sub. W.G.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Cong. Bultfontein D.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Con. Deep Levels G.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Con. G. Fields S.A.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. Pref.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. Deben.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Crown Deep	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
De Beers Consol.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 1st Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 2nd Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 3rd Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 4th Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 5th Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 6th Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 7th Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 8th Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 9th Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 10th Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 11th Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 12th Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 13th Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 14th Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 15th Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 16th Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 17th Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 18th Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 19th Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 20th Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 21st Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 22nd Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 23rd Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 24th Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 25th Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 26th Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 27th Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 28th Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 29th Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 30th Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 31st Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 32nd Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 33rd Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 34th Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 35th Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 36th Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 37th Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 38th Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 39th Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 40th Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 41st Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 42nd Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 43rd Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 44th Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 45th Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 46th Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 47th Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 48th Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 49th Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 50th Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 51st Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 52nd Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 53rd Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 54th Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 55th Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 56th Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 57th Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 58th Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 59th Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 60th Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 61st Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 62nd Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 63rd Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 64th Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 65th Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 66th Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 67th Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 68th Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 69th Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 70th Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 71st Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 72nd Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 73rd Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 74th Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 75th Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 76th Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 77th Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 78th Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 79th Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 80th Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 81st Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 82nd Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	120, Bishopgate-st.
Do. S. 83rd Deb.	1 1/4	1 1/4	1 0	—	—	1 0	—	



**AUSTRALIAN AND NEW ZEALAND MINES—(Continued).**

Baighat Mysore	G	2/9	3/3	3/-	3/8	1	0	—	0 19 0	159,945	India .....	5-7, Queen-street-p
Burma Ruby	A	3/6	3/6	3/6	3/6	1	0	—	0 18 0	208,551	Burmah...	Suffolk House E C
Champion Reef	G	5/6	5/6	5/15	5/15	1	0	s/- Jan. 16 '96	1 0 0	220,000	India .....	6-7, Queen-street-p
Quair Central	G	1/1	1/6	1/-	1/6	1	0	—	1 0 0	200,000	"	Dashwood Ho., E.C.
Cooromandel	G	15/6	15/6	15/15	15/15	1	0	—	0 17 6	95,000	"	6-7, Queen-st. place
GoldFide Mysore	G	1	1 15/6	20/6	21/8	1	0	2/- Feb '98	1 0 0	275,000	"	5-7, Queen-street pl
Kadur Mysore	G	—	—	4/-	5/-	—	0	—	0 5 0	400,000	"	Cophthal House, E.C.
Kemphokote GdFd	A	7/6	1/-	7/6	1/-	5/-	—	—	0 3 6	750,000	India .....	6-7, Queen-st. place
Mysore	G	5/6	5/6	5/6	5/6	1	0	4/8 Mar. 12 '96	1 0 0	248,354	"	6-7, Queen-street pl
My. Harbhall	G	7/6	1/3	7/6	1/3	1	0	—	0 18 0	100,007	"	2, East India Avenue
" Beate	G	7/6	8/8	7/6	8/6	1	0	—	0 19 0	160,000	"	6-7, Queen-street-pl
" West(N)G	G	15/15	15/15	15/15	15/15	1	0	ris. Jan. 16 '95	0 19 0	127,400	"	2, Gt. Winchester St
" Wynnad G	G	15/15	15/15	15/15	15/15	1	0	ris. Jan. 16 '96	0 19 0	125,000	"	—
Nine Beate	G	2/6	3/6	2/6	3/6	10/-	—	—	0 10 0	350,000	"	6-7, Queen-street-pl
Wandragang	G	20/15	20/15	20/15	20/15	1	0	2/- Mar 18 '96	1 0 0	200,000	"	—
Goregum (Df.O.)G	G	21/15	21/15	21/15	21/15	1	0	3/- Dec. 16 '95	1 0 0	145,000	"	—
" (10 1/2 Pref.)	G	31/15	31/15	31/15	31/15	1	0	3/- Dec. 16 '95	1 0 0	177,011	"	—
" (10 1/2 Pref.)	G	31/15	31/15	31/15	31/15	1	0	3/- Dec. 16 '95	0 8 0	15,388	"	—
Panang Rahang T	G	1/6	5/6	1/6	5/6	1	0	—	1 0 0	300,000	Malay Pa.	4a, Jeffrey's st. E.C.
Yerrakonda	G	7/3	1/3	7/3	1/3	4/-	—	—	1 2 8	127,491	Mysore ...	6-7, Queen-street pl







**THE CHAMPION REEF.**—Fortnightly report of Captain James Bove, superintendent, dated March 9: Dalyell's Shaft: This shaft has been sunk 7 feet; total depth below the 840 feet level, 21 feet. We are still sinking under the lode, and shall commence to take same down in a day or two.—Garland's Shaft: This shaft has been sunk 9 feet 6 inches, total depth 1,040 feet. Lode 1 foot 6 inches wide, assaying 1 ounce 2 dwts. 1 grain of gold per ton. We have to-day commenced to drive the 1,040 feet level north and south of shaft. The 940 feet level north of shaft has been driven 22 feet, total length 437 feet. Lode, 5 feet wide, assaying 1 ounce 18 dwts. of gold per ton. No. 3 rise in back of level risen 14 feet, total height 18 feet. Lode 7 feet wide, assaying 1 ounce 20 grains of gold per ton. The 940 feet level south of shaft driven 24 feet 6 inches, total length 368 ft. 6 in. Lode 4½ ft. wide, assaying 1 oz. 2 dwts. 14 grs. of gold per ton. No. 2 rise in back of level risen 3 feet 9 inches, total height 21 feet 3 inches. Lode 1 foot 9 inches wide, assaying 12 dwts. of gold per ton. The 840 feet level north of shaft driven 19 feet 6 inches, total length 809 feet 3 inches. Lode 6 inches wide, assaying 15 dwts. 5 grains of gold per ton. The 740 feet level north of shaft driven 25 feet, total length 1,058 feet 9 inches. Lode 2½ feet wide, assaying 2½ ounces 2 dwts. 6 grains of gold per ton. No. 7 rise above level risen 7 feet 6 inches, total height 44 feet 6 inches. Lode 2½ feet wide, assaying 1 ounce 4 dwts. 20 grains of gold per ton. New level south of No. 2 rise in back of 240, north of west crosscut south of No. 1 risen 8 feet, total height 8 feet. Lode 2 feet wide, assaying 12 dwts. 14 grs. of gold per ton. Winze below 540, south of east crosscut, south of shaft, sunk 5 feet 6 inches, total depth 10 feet. Lode 2 feet wide, assaying 1 ounce 12 dwts. 20 grs. of gold per ton.—Carmichael's shaft: This shaft has been sunk 7 feet 3 inches, total depth below the 540 feet level, 92 feet 3 inches. The west part of lode on which the shaft is being sunk is still without value. No. 4 rise above 540, north of east crosscut on east part of lode, risen 8 feet, total length 44 feet 9 inches. Lode 3 feet wide, assaying 1 ounce 1 dwts. 14 grs. of gold per ton. No. 3 rise in back of level risen 9 feet 9 inches, total height 87 feet 6 inches. Lode 1 foot 6 inches wide, assaying 13 dwts. of gold per ton. No. 2 rise above level risen 3 feet 6 inches, total height 94 feet 9 inches. Lode 1 foot wide, assaying 10 dwts. 12 grains of gold per ton. The 440 feet level, north of Crosscut, east of shaft, has been driven 14 feet 3 inches, total length 112 feet 3 inches. Lode 6 inches wide, assaying 16 dwts. 12 grains of gold per ton.—Rowe's shaft: The 615 feet level north of shaft has been driven 14 feet 6 inches, total length 27 feet 6 inches. Lode 3 feet wide, assaying 2 ounces 6 dwts. 12 grains of gold per ton. The 615 feet level south driven 27 feet, total length 77 feet. Lode 2 feet wide, assaying 1 ounce 19 dwts. 14 grains of gold per ton.—New vertical shaft: This has been sunk 11 feet, total depth 100 feet 3 ins. Strata still very hard and sparse for sinking.—Stops: Garland's shaft: Stripping out west side of level in 940 north of shaft, cut 5 fathoms 3 feet 6 inches. Lode 7 feet wide, assaying 1 ounce 15 dwts. 6 grains of gold per ton. Stope above 940 south of No. 1 rise cut 12 fathoms. Lode 2½ feet wide, assaying 1 ounce 15 dwts. 8 grains of gold per ton. Stope above 840 north of No. 3 north rise, cut 3 fathoms 9 inches. This is suspended for a time. New stope above 840, north of No. 4 north rise, cut 15 fathoms 4 feet 3 inches. Lode 1 foot wide, assaying 1 ounce 2 dwts. 6 grains of gold per ton. New stope above 740 north of No. 6 north rise, cut 15 fathoms 5 feet 6 inches. Lode 6 feet wide, assaying 1 ounce 2 dwts. of gold per ton. Stope south of No. 6 rise, cut 14 fathoms 1 foot 3 inches. Lode 1 foot 6 inches wide, assaying 1 ounce 2 dwts. 12 grains of gold per ton. Stope south of No. 5 rise cut 16 fathoms 9 inches. Lode 2 feet wide, assaying 1 ounce 6 dwts. 12 grains of gold per ton. Stope north of No. 3 rise, cut 5 fathoms. Lode 4 feet wide, assaying 1 ounce 16 dwts of gold per ton. Stope, south of rise, cut 5 fathoms 5 feet. Lode 4 feet wide, assaying 1 ounce 15 dwts. 20 grains of gold per ton. Stope north of No. 2 rise, cut 5 fathoms 1 foot 6 inches. Lode 6 feet wide, assaying 1 ounce 2 dwts. 20 grains of gold per ton. Stope above 630, north of No. 8 north rise, cut 10 fathoms 9 inches. Lode 3½ feet wide, assaying 2 ounces 2 dwts. 20 grains of gold per ton. Stope north of No. 7 rise, cut 10 fathoms 3 inches. No sample. This is suspended. New stope below 630. North of 740 No. 4 north rise, cut 6 fathoms 1 foot. Lode 3½ feet wide, assaying 1 ounce 2 dwts. 6 grains of gold per ton. New stope south of rise, cut 10 fathoms 1 foot. Lode 4½ feet wide, assaying 1 ounce 16 dwts. 20 grains of gold per ton. New stope below 630, north of 740 No. 2 north rise, cut 3 fathoms 5 foot 3 inches. Lode 5 feet wide, assaying 1 ounce 8 dwts. 8 grains of gold per ton. Stope south of rise, cut 19 fathoms 2 feet 6 inches. Lode 6 feet 6 inches wide, assaying 1 ounce, 15 dwts. 8 grains of gold per ton. Stope above 530 north of No. 8 north rise, cut 4 fathoms 3 feet 3 inches. Lode 6 feet wide, assaying 1 ounce 6 dwts. 12 grains of gold per ton. Stope south of rise, cut 8 fathoms 3 inches. Lode 6 feet wide, assaying 1 ounce 4 dwts. 20 grains of gold per ton. Stope north of No. 7 north rise, cut 8 fathoms 4 feet. Lode 4½ feet wide, assaying 1 ounce 3 dwts. 12 grains of gold per ton. Stope south of rise, cut 1 fathom 3 feet. Lode 3 feet wide, assaying 1 ounce 2 dwts. 16 grains of gold per ton. Stope above 530 north of No. 6 north rise, cut 4 fathoms 4 feet. Lode 3 feet wide, assaying 1 ounce 12 dwts. of gold per ton. Stope north of rise, cut 7 fathoms. Lode 3½ feet wide, assaying 1 ounce 7 dwts. 10 grains of gold per ton. Stope above 530, north of No. 2 north rise, cut 3 fathoms 2 feet 9 inches. Lode 5 feet wide, assaying 1 ounce 3 dwts. 22 grains of gold per ton. Stope south of rise cut 3 fathoms 3 inches. Lode 2 feet 9 inches wide, assaying 1 ounce 12 dwts. of gold per ton. Stope above 530, north of rise, south of west crosscut, cut 4 fathoms 1 foot 3 inches. Lode 3 feet wide, assaying 16 dwts. 20 grains of gold per ton. Stope below 440, north of 530, No. 8 north rise, cut 3 fathoms 3 inches. Lode 8 feet wide, assaying 1 ounce 6 dwts. 12 grains of gold per ton. Stope above 440, north of No. 6 north rise, cut 5 fathoms 5 feet 9 inches. Lode 6 feet wide, assaying 1 ounce 3 dwts. 1 grain of gold per ton. Stope above 440, south of No. 6 north rise, cut 7 fathoms 2 feet. Lode 4½ feet wide, assaying 13 dwts. 1 grain of gold per ton. Stope north of No. 5 north rise, cut 8 fathoms. Lode 4 feet wide, assaying 1 ounce 10 dwts. of gold per ton. Stope south of rise cut 4 fathoms 4 feet. Lode 3 feet wide, assaying 1 ounce 5 dwts. of gold per ton. Stope above 440 south of No. 4 north rise, cut 17 fathoms 1 foot 3 inches. Lode 4 feet wide, assaying 1 ounce 10 dwts. 14 grains of gold per ton. Stope about 440 south of No. 1 north rise, cut 8 fathoms 5 feet. Lode 3 feet wide, assaying 1 ounce 2 dwts. 14 grains of gold per ton. Stope below 440, south of winze at west crosscut, cut 9 fathoms 3 feet. Lode 3½ feet wide, assaying 1 ounce 10 grains of gold per ton. New stope below 340, north of No. 3 north winze, cut 10 fathoms 3 feet 9 inches. Lode 7 feet wide, assaying 1 ounce 3 dwts. 10 grains of gold per ton. Stope south of winze, cut 6 fathoms 4 feet 6 inches. Lode 6 feet wide, assaying 1 ounce 2 dwts. 14 grains of gold per ton. Stope below 340, north of 440, No. 3 north rise, cut 9 fathoms 9 inches. Lode 3 feet wide, assaying 16 dwts. 16 grains of gold per ton. Stope below 340, north of 440, No. 2 north rise, cut 3 fathoms 3 feet. Lode 4 feet wide, assaying 18 dwts. 18 grains of gold per ton. Stope above 340, north of No. 2 north rise, cut 6 fathoms 5 feet 3 inches. Lode 5 feet wide, assaying 1 ounce 15 dwts. of gold per ton. Stope above 340, north of No. 1 north rise, cut 8 fathoms 2 feet 3 inches. Lode 4½ feet wide, assaying 19 dwts. 14 grains of gold per ton. Stope below 340, north of south winze, cut 6 fathoms 2 feet 9 inches. Lode 1 foot 6 inches wide, assaying 15 dwts. 20 grains of gold per ton. Stope above 240 north of No. 2 north rise, cut 9 fathoms 3 feet 9 inches. No sample. Stope below 240, south of winze at west crosscut, cut 17 fathoms 2 feet 9 inches. Lode 2½ feet wide, assaying 1 ounce 10 dwts. of gold per ton.—Dalyell's Shaft: Stope above 620, north of 530 south winze, cut 8 fathoms 1 foot 3 inches. Lode 3½ feet

wide, assaying 16 dwts. 12 grains of gold per ton. Stope north of winze, 3 fathoms 1 foot 3 inches. Lode 2 foot wide, assaying 1 ounce 2 dwts. 20 grains of gold per ton. Stope below 440, north of south winze, cut 1 fathom 1 foot. Lode 2½ feet wide, assaying 1 ounce 6 dwts. 3 grains of gold per ton.—Ribblesdale's Shaft: Stope above 640, south of east crosscut, at south of shaft, cut 11 fathoms 5 feet. Lode 3 feet wide, assaying 1 ounce 15 dwts. 8 grains of gold per ton. Stope above 540, north of No. 4 south rise, cut 22 fathoms 3 feet 3 inches. Lode 6 feet wide, assaying 18 dwts. of gold per ton. Stope above 540, north of No. 3 south rise, cut 14 fathoms 1 foot. Lode 3 feet wide, assaying 1 ounce 5 dwts. of gold per ton. No. 1 stope above 540, north of No. 1 south rise, cut 5 fathoms 9 inches. Lode 4 feet wide, assaying 1 ounce 2 dwts. 14 grains of gold per ton. No. 2 stope north of rise, cut 4 fathoms 3 feet 9 inches. Lode 2½ feet wide, assaying 12 dwts. 6 grains of gold per ton. Stope south of No. 1 south rise, cut 3 fathoms 3 feet. Lode 2½ feet wide, assaying 1 ounce 4 dwts. 13 grains of gold per ton. Stope above 440 south of No. 1 west crosscut, cut 6 fathoms 3 feet. Lode 10 feet wide, assaying 1 ounce 12 dwts. 16 grains of gold per ton. Stope south of No. 2 west crosscut, cut 7 fathoms 1 foot 9 inches. Lode 4 feet wide, assaying 19 dwts. 14 grains of gold per ton. Stope above 440, south of shaft, cut 2 fathoms 5 feet. Lode 2 feet wide, assaying 18 dwts. 6 grains of gold per ton. Stope below north level, north of east crosscut, at 340 south, cut 12 fathoms 2 feet 6 inches. Lode 8 feet wide, assaying 1 ounce 2 dwts. 6 grains of gold per ton. Stope above 340, south of No. 1 south rise, cut 6 fathoms 3 feet 8 inches. Lode 3 feet wide, assaying 1 ounce 15 dwts. of gold per ton. Stope north of rise, cut 4 fathoms 6 inches. Lode 2 feet wide, assaying 1 ounce 6 dwts. 3 grains of gold per ton. No. 1 stope above 340 north on fold, cut 7 fathoms 6 inches. Lode 8 feet wide, assaying 1 ounce 2 dwts. 14 grains of gold per ton. No. 2 stope on fold, cut 4 fathoms 5 feet 9 inches. Lode 3 feet wide, assaying 1 ounce 15 dwts. 8 grains of gold per ton. No. 2 stope north of No. 2 rise, above 240 south, cut 10 fathoms 4 feet. Lode 6 feet wide, assaying 1 ounce 4 dwts. of gold per ton. No. 2 stope, south of No. 1 rise, above 240 south, cut 7 fathoms 4 feet. Lode 8 feet wide, assaying 1 ounce 2 dwts. 14 grains of gold per ton. No. 3 stope south of rise, cut 7 fathoms 5 feet 9 inches. Lode 8 feet wide, assaying 1 ounce 12 dwts. 14 grains of gold per ton. Stope north of No. 1 rise, about 240 south, cut 8 fathoms 2 feet 6 inches. Lode 6 feet wide, assaying 18 dwts. 12 grains of gold per ton. Stope on east part of lode, above 240 south, cut 8 fathoms 4 feet 6 inches. Lode 2 feet wide, assaying 1 ounce 9 dwts. 14 grains of gold per ton. Stope below 240 north on fold, cut 3 fathoms 4 feet. Lode 2 feet wide, assaying 1 ounce 2 dwts. of gold per ton.—Carmichael's shaft: Stope above 540, south of No. 1 north rise, cut 12 fathoms 3 feet. Lode 4 feet wide, assaying 1 ounce 15 dwts. of gold per ton. Stope north of No. 2 rise, cut 6 fathoms 1 foot. Lode 3 feet wide, assaying 1 ounce 12 dwts. 16 grains of gold per ton. New stope south of No. 3 north rise, cut 11 fathoms 1 foot 6 inches. Lode 7 feet wide, assaying 1 ounce 1 dwts. 6 grains of gold per ton. New stope south of No. 4 rise, cut 11 fathoms 5 feet. Lode 7 feet wide, assaying 1 ounce 2 dwts. of gold per ton. Stope below 440, north of south winze, cut 7 fathoms 2 feet. Lode 3 feet wide, assaying 1 ounce 9 dwts. 14 grains of gold per ton. Stope south of winze, cut 6 fathoms 9 inches. Lode 2 feet wide, assaying 1 ounce 12 grains of gold per ton.—Rowe's shaft: Stopping bottom of 515 feet level south of shaft, cut 7 fathoms, no sample. New stope below 415 north of south winze, cut 3 fathoms. Lode 2 feet wide, assaying 1 ounce 2 dwts. 3 grains of gold per ton. Stope above 315 north of shaft, cut 4 fathoms 2 feet 9 inches. Lode 2 feet wide, assaying 1 ounce 16 dwts. 12 grains of gold per ton. Stope above 315 south of south rise, cut 8 fathoms 3 feet 9 inches. Lode 2 feet wide, assaying 16 dwts. 16 grains of gold per ton. Stope above 315 north of south rise, cut 10 fathoms 3 feet 9 inches. Lode 6 feet wide, assaying 1 ounce 5 dwts. 12 grains of gold per ton. The above stope is for February month.—Returns: During February month 4,725 tons of quartz were stamped, which produced 5,990 ounces of gold. 1,140 tons of tailings were treated, which produced 314 ounces of gold, making a total yield for the month of 6,304 ounces of gold.

**DE LAMAR.**—Report on our mining and milling operations for the month ending February 29th 1896: Mining—Ore Breaking Department.—Wilson vein, above 3rd level: Average width of vein 4 feet 3 inches, assaying 24.75 dwts. in gold and 1 dol. in silver = 25.75 dwts. per ton.—Hamilton vein, above 5th level: Average width of vein, 5 feet 3 inches, assaying 15 dwts. in gold and 1.50 dwts. in silver = 16.50 dwts. per ton.—77 feet vein, above 4th level, intermediate: Average width of vein 3 feet 6 inches, assaying 23.75 dwts. in gold and 1 dol. in silver = 24.75 dwts. per ton.—77 feet vein, above 4th level, west: Average width of vein 4 feet, assaying 17.75 dwts. in gold and 1 dol. in silver = 18.75 dwts. per ton.—77 feet vein, above 6th level: Average width of vein 4 feet 3 inches, assaying 19 dwts. in gold and 1 dol. in silver = 20 dwts. per ton.—77 feet vein, above 7th level: Average width of vein 8 feet, assaying 12.75 dwts. in gold and 5.75 dwts. in silver = 18.50 dwts. per ton.—77 feet vein, above 8th level: Average width of vein 4 feet, assaying 7 dwts. in gold and 14.50 dwts. in silver = 21.50 dwts. per ton.—77 feet vein, above 9th level: Average width of vein 4 feet 6 inches, assaying 9.50 dwts. in gold and 11.40 dwts. in silver = 20.90 dwts. per ton.—77 feet vein, above 10th level: Average width of vein 2 feet 6 inches, assaying 13.60 dwts. in gold and 3.70 dwts. in silver = 17.30 dwts. per ton.—No. 5 vein, above 4th level: Average width of vein 2 feet 3 inches, assaying 21 dwts. in gold and 1 dol. in silver = 22 dwts. per ton.—No. 5 vein, above 5th level: Average width of vein 4 feet, assaying 24.10 dwts. in gold and 1 dol. in silver = 25.10 dwts. per ton.—No. 5 vein, above 6th level: Average width of vein 3 feet, assaying 16.10 dwts. in gold and 2 dwts. in silver = 18.10 dwts. per ton.—No. 6 vein, above 10th level: Average width of vein 2 feet 9 inches, assaying 15.50 dwts. in gold and 2.25 dwts. in silver = 17.75 dwts. per ton.—No. 7 vein, above 7th level: Average width of vein 2 feet 9 inches, assaying 21.25 dwts. in gold and 1 dol. in silver = 22.25 dwts. per ton.—No. 9 vein, above 7th level: Average width of vein 3 feet, assaying 17.55 dwts. in gold and 2.75 dwts. in silver = 20.30 dwts. per ton.—No. 9 vein, above 8th level: Average width of vein 2 feet 3 inches, assaying 26.25 dwts. in gold and 1.35 in silver = 27.60 dwts. per ton.—No. 9 vein, above 9th level: Average width of vein 3 feet, assaying 26 dwts. in gold and 2.40 dwts. in silver = 28.40 dwts. per ton.—Anchor vein, 4th level: Average width of vein 3 feet, assaying 20 dwts. in gold and 1 dol. in silver = 21 dwts. per ton.—Note: The average yield of the stope for February is less than it was in January. Prospecting Department.—Hamilton vein, 6th level, east: This level was advanced a few feet and then suspended, the men being required elsewhere.—Hamilton vein, 8th level, east: Advanced for the month 25 feet. The average width and values were as follows: Width 2 feet 4 inches, assaying 24 dwts. in gold, and 9.25 dwts. in silver = 33.25 dwts. per ton. During the latter part of the month the Iron Dyke was entered and the level continued on the contact between the dyke and the porphyry and which has produced some shipping ore.—Hamilton vein, 8th level, west: Advanced for the month 49 feet. The average width of the vein has been 2 feet 9 inches; assaying 17.50 dwts. in gold and 6.60 dwts. in silver = 24.10 dwts. per ton.—Hamilton vein, east level, from Wahl tunnel: Advanced for the month 49 feet. This level is being driven for the purpose of reaching the eastern section of the mine; it is being driven in solid ground. A continuation of this level has been driven east of the No. 1 incline shaft for the month 70 feet. This new thoroughfare will take the place of the old one which was driven close to the dyke, and which requires constant renewals of timber to keep it open.—77 feet vein, 4th level, west: The operations consist of sinking two winzes below the 4th level. Their respective depths are: No. 1 Winze deepened 9 feet 6 in., total 40 feet. No. 2 winze total depth 30 feet 3 inches. The vein averages 5 feet wide, assaying 16 dwts. in gold and 1 dol. silver = 17 dwts. per ton. No. 2 winze is now connected with a raise from No. 5 level, west.—77 feet vein, operations on 9th level: The amount of driving performed in search of branches or veins for the month amounts to 23 feet 3 inches. This work has developed nothing of value. No. 5 vein, 5th level, west: Advanced for the month 24 feet. The vein passed through forms part of the impoverished section standing between No. 2 and No. 3 ore—"shoots" on the Nos. 5 and 77 feet veins combined.—No. 9 vein, 7th level: Advanced for the month 30 feet; average width, 4 feet; assaying 22.20 dwts. in gold and 1.50 in silver = 23.70 dwts.

per ton.—No. 10 vein, above 8th level: This vein has produced a fair quantity of good shipping ore, and looks quite promising.—Anchor vein, 4th level: Our explorations on the vein have been of a satisfactory character. They have been included in the ore breaking department for this month.—Miscellaneous work: Sundry cross-cutting near the Anchor vein, 5 feet. Continuation of cross-cut from No. 5 vein, south, on 4th level, 42 feet. At this point the cross-cut intersected what is supposed to be the No. 9 vein. On this vein there was driven 22 feet 6 inch easterly. The vein averages 4 feet wide, and assays 10 dwts. to 12 dwts. per ton, chiefly gold. At the 8th level, east, the station for the new shaft has been partially completed.—Milling department.—Table of work performed for the month of February 1896: Number of tons crushed (wet), 3,698.61 tons; number of tons crushed (dry), 3,327.72 tons; assay value of the pulp—gold, 14.93 dwts.; silver, 5.22 dwts.; total, 20.15 dwts. Assay value of the tailings—gold, 4.04 dwts.; silver, 0.86; total, 4.90 dwts. Percentage saved, total, 75.69%; number of Doré bars produced, 16 bars; number of ounces pure gold produced, 1,789.359 ozs.; number of ounces fine silver produced, 26,611.79. Value of gold produced, 35,787.18 dwts.; value of silver produced, 15,967.06 dwts.; ore shipped during the month, 7,000 dwts.; surplus on sales of bullion, 3,470.75 dwts.; miscellaneous revenue, 563.09 dwts.; total, 62,788.08 dwts.; deduct all expenses for the month, 37,330.17 dwts.; estimated profit for month (or at 4.90 dwts. to £ sterling, £5,196), 25,457.91 dwts.—Pelatan-Clerici process: All the machinery has been installed. It has taken time to adjust the various parts, necessitating several changes. We hope in a few days from date to report a successful commencement of the whole or part of the plant. Every department is in its usual good order and working satisfactorily.—John W. Plummer, Manager, De Lamar, Idaho, U.S.A., March 12th 1896.

**HANNAN'S STAR.**—The directors have received advices from the mines superintendent, dated 22nd February, giving the following information: Main Shaft.—At the beginning of the month commenced to drive north on course of Boulder Lode, and have driven 17 feet. The lode, which was 1 foot thick, consisting of ironstone and quartz, got smaller going forward. On the 15th, it was about 1 foot thick on the bottom of the level, and only just a thread at the back of same. A sample assayed 1 ounce 19 dwts. 14 grains. A sample taken on the 18th assayed 15 dwts. 16 grains per ton. It was decided to discontinue driving for the present, and to commence to drive south on the course of the formation towards the Underlay Shaft. The mine superintendent adds—I am more than ever convinced that we are on the top of the Great Boulder Lode and also that of the Boulder Main Reef. In the bottom of the level going north the vein is 1 foot thick, and in the back of the same it is just a mere thread. There is nothing showing in south side of the crosscut, which, in my opinion, shows conclusively that the lode has gone underfoot. He therefore recommends the sinking of the main shaft 100 ft. deeper at least.—West Shaft: The Eastern Crosscut has been extended a further distance of 13 feet, making a total of 22 feet from the shaft; the ground latterly being exceedingly hard diorite. This crosscut was discontinued, and a drive west commenced to prove the ground in that direction, and driven 13 feet from the shaft. The ground was rather hard at the commencement, but is now soft brown slate. At the 52 feet level, a winze platt has been cut 6 feet high, 5 feet wide, and 5 feet deep, and a winze sunk 10 feet through the formation. This winze will be continued down to the 112 feet level. The shaft is now making a great deal more water—fully 2,000 gallons per 24 hours. He adds: The great water difficulty, so far as we are concerned, has been overcome without the necessity for going a long distance to take up water rights. In the 112 feet crosscut in this shaft passed through a vein of quartz and ironstone 1 foot thick.—James' Shaft: The Western crosscut has been extended a further distance of 40 feet, making a total distance of 75 feet from the shaft in good blasting ground. The strata have turned and are now underlaying east, whereas they had been underlaying west. The change I consider a good indication.—General: The locally made condenser was completed on the 5th February and started on the same day. Everything is working satisfactorily, making about 150 gallons of fresh water per day of 12 hours.

**ALMADA AND TIRITO.**—Extract from the superintendent's letter, dated March 9: The lode in the 150 north of Taylor's has improved, and has the best appearance of anything we have seen in the new mine. The lode is 5 feet wide, and mineralised throughout, yielding 4 tons at 33 ounces per ton. A sample from the present forebreast gave (without cleaning) 32½ ounces silver per ton, and after cleaning 38 ounces. The lode in the drive, coming towards this end from Wilde's shaft, has also improved, and contains good stones of ore. There are about 200 feet to drive in order to effect this communication.—Copy of cablegram received March 30: Lode opening up well. North level Taylor's 9 feet wide, estimate the yield at 3 tons per fathom, assaying 35 to 40 ounces silver per ton.

**GOLDEN DOVE.**—The following is the report of work done on the Golden Dove Mine during the month of February: Golden Dove shaft No. 1. Stopping operations from this shaft is being carried on, and is yielding good ore.—Golden Dove No. 2. Here also the reef is being stoped out towards No. 1 shaft. No. 2 shaft, for some 20 feet in the stope, is bad, making it necessary to work with care. Drive west from No. 2 has been driven a further 25 feet, total 46 feet.—Golden Dove shaft No. 3. This shaft has been sunk a further 12 feet, total 70 feet.—Scott's shaft No. 1. This shaft has been sunk a further 2 feet, total 80 feet. The reason of the small amount of work being done in this shaft is that we have this month commenced to stope from this shaft, and the falling reef made it impossible to put the hands to work in the shaft. Perpendicular shaft drive east from this shaft towards No. 1 Scott's was driven a further 16 feet, total 31 feet, before breaking through. Drive west has been driven 26 feet, total 36 feet.—Scott's shaft No. 2. This shaft has been sunk a further 17 feet, total 78 feet. The new find which was reported last month has been sunk on 15 feet; no material alteration having taken place, I decided to drive from perpendicular shaft, and intercept it at a depth of 70 feet. To do this about 6 feet of driving will be necessary. Low level adit has been advanced a further 21 feet, total 393 feet. Stringers of quartz, sparsely charged with pyrite, are constantly being met with, which makes me think we are nearing a lode, probably Scott's. There is no change to note in any of the workings. A new road for the transport of ore from the mine to battery is in course of construction.—Battery. The framework of battery is erected, and is now being rivetted up.—Pump well. The timbering of this was completed yesterday, and is now ready to receive the pump.—Main block. For a time work is suspended on this property, and the hands brought over on the Golden Dove. The reason for doing this is, just now the work is very heavy and more important here, but as soon as the heavy work is finished work will be again resumed on Main block, and the drive mentioned in the previous report started again. The stone crusher, boiler, pump, &c., arrived on the opposite side of the river to-day. As soon as the rivetting of battery is completed steps will be taken for bringing it over. In the meantime, the necessary tackle and fixings will be got ready, so that there will be no delay. No trouble in bringing it on the mine is anticipated. Labour is plentiful.

**ORIENTAL.**—Superintendent's report for fortnight ending March 7: Taylor's engine shaft. Here we have attained a depth of 125 feet, showing the shaft was deepened 10 feet during the past fortnight. At present we have to contend with a considerable increase in the quantity of water caused by our cutting through a floor, but we hope this increase is only a temporary one, as otherwise one result would be to impede progress which we are anxious to avoid.—Bridge shaft. In the 105 feet level south an advance of 3 feet was made in the two weeks, the total length of the level now being 133 feet. The lode is composed of quartz 3 feet wide, and is very regular, but continues extremely hard for driving through. A sample from it yielded 9 dwts. 2 grains of gold per ton on assay.—Trial shaft No. 2. Since my last report 7½ feet have been sunk and the shaft is now 57½ feet deep. The lode is still a strong one, averaging 6 feet wide, and carries more quartz than it has hitherto done. This quartz occurs in two veins—one in the footwall and another in the hanging—both of which are very regular, yielding 10 grains of gold per ton according to the assay of the sample taken.—Surface operations. With these very satisfactory progress is being made.



**ALAMILLOS.**—Mine Report, dated 25th March.—In the 40 fathom level driving east of Santa Agueda Shaft the lode has fallen off a little in value, and is now estimated at 1 ton per fathom. The 70 east of San Felipe shaft has communicated with Sanz Winze, and will be continued east of the same, valued at  $\frac{1}{2}$  ton per fathom. The lode in the 85 west of Taylor's engine shaft is unproductive. In the 160 west of the same shaft no lode has been discovered up to the present. Herman's Winze sinking below the 60: The lode is producing good stones of lead, worth  $\frac{1}{2}$  ton per fathom. Marques' Winze below the 100 fathoms level, valued at  $\frac{1}{4}$  ton per fathom; the lode is regular and has a good appearance. Diaz's Rise above the 100 fathoms level: The lode has improved and is now valued at 5 tons per fathom.

**BRITISH BROKEN HILL PROPRIETARY.**—Mining Manager's report for the week ending February 19th, 1896: Blackwood Shaft.—During the week 189 tons of ore have been broken from the East vein, and hoisted to the surface, all the ore being of good milling grade. Average assay, 12% lead, 11 ounces silver, and 12% zinc. Howell Shaft.—In the far north stope, 200 level, going south, good faces have been opened up, 88½ tons of ore having been hoisted to the surface from the ore chute on this level. Surface.—All work in connexion with the Jig Plant is progressing satisfactorily. Ore Shipments.—30 trucks of carbonate ore were shipped to Port Adelaide, and 21 trucks of sulphide to Block 14 Mine. Assays of the following lots (4) have been agreed with Block 14 Coy, Port Adelaide, from previous deliveries—viz., 233 tons containing 47 tons lead, and 7,164 ounces silver. Assays for the week—Carbonates, lead from 20½ to 54½, and silver from 1 to 35 ounces per ton.

**CROWN UNITED.**—Extracts from mining engineers' report: We have the honour to report as follows on this property, visited by our Mr. Woodhouse and Mr. C. Parsons on Monday, 24th inst.: We have pleasure in stating that the tunnel and water shaft are progressing very satisfactorily. The tunnel has now been extended 460 feet, and is highly creditable to the manager. Another 75 feet should place us under the workings on the cornet block, and we can assure you we shall be in a position to deliver ore to the Millsite long before we can erect our battery. The delay in erection of machinery is no fault of ours, but is due to the incapacity from want of trucks of the Government railway to transport from Fremantle to the terminus; 300 tons of cargo arrive daily, and the Government can only remove some 25 tons, and the chaos at the landing stage is terrible. The Manager, Mr. Lapham, is pushing down the water shaft, and has secured timber to go on, with and has made arrangements for an ample supply in future. We have no doubt but that all the water for battery will be secured, but we have instructed water shaft to be continued to 150 feet before driving to open out supplies. The erection of battery after delivery on the mine will be a quick matter, and, as above stated, we are making every effort to obtain the earliest possible transport.—Cooper and Woodhouse.

**CITY OF LONDON.**—London Mine (25 mile W.A.): Some very nice looking stone has been broken out from the 70 feet level of the Underlie Shaft at the London Mine (25 mile), which is being sunk to connect with the main workings. The lode, which is 4 feet wide, is studded with gold, which runs right into the heart of the stone, and there are masses of galena accompanying the precious metal. All the lower workings of the mine continue to open up as well as heretofore, and the development work being carried on is daily advancing the value of the property.—*Coalfield Miner*, February 25th 1896.

**FORTUNA.**—Mine Report, dated 25th March.—Cañada Incocha Mine: In the 110 fathoms level driving west of San Pedro's shaft the lode is regular but rather small, valued at  $\frac{1}{2}$  ton per fathom. Los Salidos Mine: The lode in the 212 east of Taylor's engine shaft is very much disarranged. In the 200 east of the same shaft the lode is unproductive and the ground is very hard. The lode in the 92 west of Palgrave's shaft is pinched very small, and is of no value at present.

**HAMPTON PLAINS EXPLORATION.**—The following is the weekly report, dated 22nd February, of work done on Block 59: No. 1 shaft has been sunk 25 feet, making total depth of shaft from surface 55 feet. The reef pinched out to about 8 inches, but is making in size again. The average width of lode from top to bottom of shaft is about 2 feet 6 inches. The stone when dollied prospects very fairly. As rough pieces of gold were obtained in the stone near the surface, the probability is that a rich body of ore will be met with in driving along the reef between the two shafts. During the week two shifts of men have been employed at this (No. 1) shaft. No. 2 shaft has been sunk 23 feet, making total depth of shaft 30 feet. I expect to cut the reef in this (No. 2) shaft during the next week. Two shifts of men are also employed at this shaft. During the week I have had one man opening out another reef within the boundary of the leases pegged out, but so far nothing good has been met with.

**LINARES LEAD.**—Mine Report dated 25th March: Loro Ancho Mine, Peill's Engine Shaft. In the 200 fathoms level driving west the lode continues large and produces good stones of ore, valued at  $\frac{1}{2}$  ton per fathom. The lode in the 178 west is small and unproductive. Warner's Crosscut: In the 200 east the lode is strong and very promising, especially in the upper part of the level. The lode in the 200 west is well formed, but not of any value at present. In the 178 west the lode is regular and well-formed, and has a promising appearance, estimated at 1 ton per fathom.—Los Quinientos Mine, Taylor's Engine Shaft: In the 200 fathoms crosscut driving south the granite is very hard, but every effort is being made to reach the lode by the end of the month. The lode in the 185 east is more promising, but does not contain ore enough to value. In the 165 east, valued at 1 ton per fathom, good stopping ground is being opened up. In the 150 east nothing of importance has been met with. Castero's winze, below the 165 fathoms level: The lode is more open, and is yielding good lumps of ore, worth 1 ton per fathom.

**MENZIES "CRUSOE."**—The following information is to hand from the Company's manager under date Menzies, February 22nd: Robinson Crusoe Lease, C Shaft.—We are still sinking at a steep grade; have not got the reef yet, and may have to crosscut to the footwall for it when the winze is down a sufficient depth, which will be in another 30 feet. This information is supplemented by a cablegram received on March 30th as follows: "Four feet Mundic reef in the bottom of Winze Robinson Crusoe 'C' Shaft, assay value three ounces per ton.—E Shaft. Have sunk winze from the north level a further depth of 17 feet. Total, 90 feet. We are still taking about 2 feet of stone with the winze, leaving strong reef overhead, some of the stone showing splendid gold. Samples by dish equal to from 1½ ounces to 5 ounces per ton.—F Shaft. Have driven crosscut to hanging wall 9 feet and footwall 7 feet, both still in formation, carrying gold bearing leaders through it.—Everything in connexion with the mines working very satisfactorily.

**MENZIES CONSOLIDATED.**—The following information is to hand from the manager under date Menzies, Feb. 22nd: Royal Group, Eva Shaft.—Total depth of shaft, 127 feet; water level reached. May Shaft.—Total depth, 124 feet. Strong flow of water too heavy for windlass work. Lode 18 inches wide. Samples carefully selected and tested with the "dolly" gave a return equal to 6 ounces of gold per ton. This of course is highly satisfactory. We are taking sufficient water from this shaft to supply all our present wants, and as the water is making faster than we require it, we propose to suspend sinking this shaft any deeper at present. St. Albans, North Shaft.—Flat cut at bottom of the shaft 47 feet from surface. The lode is very irregular, varying in size from 6 inches to 2 feet. A sample taken from the latter part gave a return equal to 2 ozs. of gold per ton. The lode in this shaft is quite distinct from the lode in the underlay shaft further to the south. The condenser which we have erected is working highly satisfactorily, supplying the wants of our camp.

**MOUNT MAGNET.**—The following fortnightly report has been received from the General Manager, dated Feb. 25: The mullock pass is now down 45 feet, yielding 18" of high grade stone. The office shaft is sunk to a depth of 43 feet. We are carrying 2 feet of quartz, which so far is of low grade, but it will pay for the crushing when we have a battery on the ground. When we reach the 50 feet level I intend cross-cutting the lode to prove its value and strength. The shaft near the south-east boundary is down 33 feet. The lode body is west of the shaft. It is our intention to sink to 60 feet and then tap the reef in settled country. To sink in course of reef would be too expensive, hence our sinking on the foot wall.

**NEW RIETFOONTEIN ESTATE.**—The Johannesburg Consolidated Investment Company are in receipt of a report from the above Company containing the following: Manager's report states

that most of the ore milled during February was taken from the 6th level No. 2 mine, where the stopes have been showing up very satisfactorily. Reef is looking particularly well in West Drive 7th level, and samples taken show an exceptionally high average. Reef in the deepest parts of the mine is equal to, if not better than, any other part of the mine. Development in No. 7 mine is being pushed forward rapidly and at No. 5 shaft prospecting work has been commenced. New Rock House has been completed, and is answering satisfactorily.

**AUSTRALASIAN.**—Fortnightly report of Captain John James, manager, dated February 13: During the past fortnight Bishop and party have sunk the shaft 22 feet, total 706 feet, and timbered 27 feet; total timbered 697 feet. The first 10 feet of sinking was through the same class of country as last reported on. At 694 feet we cut a break about 2 feet thick, dipping east about 1 in 2. The break is a spotted conglomerate, and under it is 2 feet of purple rock. The country at present being penetrated is of a grey nature, and some leaders have been cut, running the true course of a reef. I am unable to say much of the change at present, but will advise you fully in a few days. The water is about the same. Bishop and party have 44 feet more to finish their contract, when the shaft will be down 750 feet from surface.

**BIG BLOW.**—Report received from Mr. W. M. Vivian, dated February 26:—Battery. The amalgamating tables and some of the sluice boxes are now completed. Only the remainder of these and the settling tanks have now to be constructed; we shall then be ready to commence crushing.—Water shaft. The crosscut towards the reef has been driven 8 feet, making a total distance of 8 feet from the shaft. The ground is an extremely hard diorite, with small veins of pyrites and felspar. While in such close country we cannot expect very much increase in the influx of water. The total quantity of water from both water shafts is 2000 gallons per diem, and the quantity required for steam boilers and human consumption is about 800 gallons per diem, leaving 1200 gallons available for the battery.

**COROMANDEL.**—Superintendent's report for fortnight ending March 7: Prospect shaft. This shaft has been sunk during the fortnight 20 feet, being now 34 feet below the 600 feet level.—600 crosscut. This has been driven to 27 feet 6 inches, and suspended. Drive north has been commenced on a branch 6 inches wide, discovered in this crosscut, which appears to be the lode.—500 feet level south. The crosscut east has been extended 13 feet, total 415 feet. There is no discovery, and the ground is extremely hard for driving.—200 feet level north. The winze below this level has been sunk 6 feet 6 inches, total 60 feet. Sinking has been suspended, and a drift south commenced to communicate with the 200 feet level north of Prospect shaft. The lode is 2 feet wide, and assays 1 ounce 4 dwts. of gold per ton.—East shaft. The 600 feet level north of the winze has been driven 9 feet, total 42 feet, and suspended. This machine has been placed to drive the 600 feet level north of Prospect shaft.—500 feet level north. Driven 5 feet, total 179 feet 6 inches. Lode 2 feet 6 inches wide, worth 15 dwts. of gold per ton.—320 feet level north. Driven 9 feet, total 440 feet, and suspended. Machine placed to drive south of the crosscut at this level on same lode. Driven 18 feet, total 18 feet. Lode 1 foot wide, assaying 5 dwts. of gold per ton.—200 feet level north. Driven 30 feet, total 411 feet 6 inches. Lode in end consists of a few stringers of quartz, which show a trace of gold in the pan.—Mill. The erection of the engine and mill is now almost completed, and we are awaiting the arrival of main steam pipes from Madras. These are expected in a day or two, and we hope to start crushing during the coming fortnight.

**CRAB'S CALEDONIA.**—The following fortnightly report has been received from the mine, dated Charters Towers, February 13: The company cleaned up on the 11th inst. from a crushing of 123 tons for a yield of 111 ounces 10 dwts. of gold. In the underhand stope the reef averages about 7 inches, and in the other two stopes in the end of the crosscut from the old level the reef averages about the same. In the two stopes in the hanging wall the reef is about the same as last reported. No. 7 crosscut has been extended a further distance of 7 feet, making a total of 174 feet from the starting point. Hooper and party have crushed during this fortnight at the Defiance mill 29 tons, for a yield of 60 ounces 12 dwts. 18 grains of smelted gold. Bowater and party have also crushed during this fortnight at the Defiance mill 31 tons for a yield of 38 ounces 3 dwts. of smelted gold. Shepherd and party have extended No. 4 level a further distance of 1 foot, making a total of 6 feet from the starting point, and they have got about 21 tons of stone broken. Johnson and party have made a fair start with their tribute. Slade and party in the underhand stope from No. 6 level have got about 12 tons of stone broken. The haulage of quartz for the company for this fortnight is 28 tons, making a total of 102 tons, which has been carted to the Pretoria mill and crushed.—G. Cabassi.

**FORBES REEF.**—The mine manager, under letter dated March 1, reports progress for the month of February as follows:—Avalanche mill. Tons milled, 2470; number of stamps working, 20; number of days mill ran, 21 days 18 hours; smelted gold won, 144 ounces 9 dwts. 10 grains.—Avalanche Mine. Tons mined and sent to mill, 2470. Tramways altered and extended as required. New timber put in the drifts when needed, and everything done to keep the mine in good order and ahead of mill requirements.—Boring. No. 9 bore hole (east of main reef outcrop) has been sunk 80 feet this month. The strata cut was schists. At a depth of 80 feet hard quartz was met, and not having any carbons, further boring was suspended. The parcel of carbons sent out by our London office has been detained by the postal authorities. Pretoria, as the packet is supposed to contain dutiable goods. This has delayed boring operations.—Working costs. Working costs for this month will be about same as last month. There will be a small profit on this month's operations.

**GOLD FIELDS OF MYSORE.**—Mine report for fortnight ending March 10: South shaft. The 280 feet level end north on West Ba'aghat lode driven 11 feet, total 218 feet 6 inches. The lode formation is 3 feet wide, showing a little quartz and arsenical pyrites, assaying 15 grains of gold per ton. The crosscut east has been extended 14 feet, total 427 feet 9 inches; it has traversed several small veins of calcareous matter, but none of any value.—Oriental lode. The 280 feet level north. The crosscut west has been driven 21 feet and holed to the rise from the 380 feet level.—The 380 feet level north. The crosscut west has been extended 12 feet 6 inches, total 170 feet 6 inches. Since passing the lode spoken of in my last report nothing of importance has been met with here. No. 2 rise going up against the middle shaft has been risen 4 feet, total 114 feet above the level. It is being risen on the line of the middle shaft wholly in the country rock. The end driving south at this level has been extended 17 feet, total 446 feet 5 inches. It is still in the dyke and does not produce any quartz. The 470 feet level north has been extended 20 feet, total 198 feet. The lode formation is 3 feet wide, showing vertical veins of calcareous matter, but of no assay value.—South shaft. This has been sunk a further distance of 4 feet 8 inches, total 35 feet 8 inches below the 470 feet level. The lode is 6 feet wide, with quartz veins scattered throughout the whole width. The assay value is now 1 ounce 9 dwts. 15 grains of gold per ton.—Stopes. The 280 feet level stope north of shaft stopped 10 fathoms 1 foot 3 inches. Lode 8 feet wide, assaying 2 dwts. 7 grains of gold per ton. No. 2 stope south of shaft stopped 1 fathom 0 feet 10 inches. Lode 2½ feet wide, assaying 5 dwts. 2 grains of gold per ton. The 380 feet level north stope south of No. 1 rise stopped 5 fathoms 1 foot. Lode 5 feet wide, quartz assaying 2 dwts. of gold per ton. The 380 feet level south No. 1 stope stopped 1 fathom 0 feet 7 inches. Lode 6 feet wide, assaying 4 dwts. of gold per ton. No. 2 stope stopped 1 fathom 2 feet. Lode 4 feet wide, assaying 2 dwts. 7 grains of gold per ton. The 470 feet level south, a new rise 130 feet from shaft. Lode 2 feet wide, assaying 1 ounce 19 dwts. 2 grains of gold per ton.—Middle shaft. Sinking of this shaft was resumed on the 1st, and 4 feet 6 inches have been accomplished, making its total depth 20 feet 6 inches under the 235 feet level. The shaft is going down in country rock, and does not produce any quartz.—Prospecting shaft, Golconda block. This shaft has been sunk a further distance of 1 foot, making a total of 77 feet from surface. Finding the pyrites all died out, and not seeing anything in the shape of a vein, sinking has been discontinued, and the crosscut west resumed to see if any vein can be found in that direction.—Ajajpall. The shaft has been sunk 2 feet, total 79 feet from surface,

Owing to the quantity of water we have now to draw by windlass, the progress in sinking is slow; we shall, however, within a few days have the small engine in order, when we hope to be able to get down faster.

**HERBERT.**—Advices from Western Australia report that a very high grade has been struck on the Old Chum lease, which is now the property of this company. The quartz, which is now stated to be a brown looking stone, shows both coarse and fine gold freely, and 50 tons of ore are to be treated immediately. According to the *Golden Age* there are three reefs running through the lease, and each is gold bearing.

**KEMPINKOTE.**—Mine report for fortnight ending March 9: Garland's shaft. 500 main crosscut west has been driven 4 feet 9 inches, total distance from shaft 49 feet 6 inches. About 47 feet from shaft the hanging-wall was met with, showing the lode to be about 22 feet wide at this point. The drive has been suspended, and the coolies put to crosscut west about 100 feet north of main crosscut.—500 north drive, No. 1 crosscut west. 100 feet north main crosscut has been driven 6 feet 3 inches, total distance from footwall 14 feet 9 inches. Lode in the end full size of the drive, assaying 4 dwts. 21 grains of gold per ton. 500 north drive has been driven 62 feet, total distance from main crosscut 177 feet 6 inches. Here we are carrying about 7 feet of the footwall part of the lode, assaying 14 grains of gold per ton. 500 south drive has been driven 41 feet, total distance from main crosscut 171 feet 3 inches. We are carrying the footwall and 3 feet of the lode, assaying 12 grains of gold per ton.—345 north drive, No. 2 crosscut west. 180 feet north of main crosscut has been driven 8 feet 3 inches, total distance from footwall 14 feet 3 inches. Lode in the end full size of the drive, assaying 18 grains of gold per ton. Not having met with anything of value here, the drive has been stopped, and the coolies put to drive a crosscut west about 150 feet south of 500 main crosscut. 245 north drive crosscut east, bottom of No. 2 winze, has been driven 6 feet, total distance 43 feet. Lode in the end full size of the drive, assaying 1 dwt. 12 grains of gold per ton. 245 south drive has been driven 25 feet, total distance from main crosscut 655 feet. Lode in the end about 4 feet wide, assaying 6 grains of gold per ton. 183 north drive, No. 1 crosscut west, has been driven 14 feet, total distance 38 feet. The ground in the end is mixed. 183 No. 2 crosscut east has been driven 9 feet 6 inches, total distance 55 feet 9 inches. About 52 feet from level schist was met with; this continues.

**KINSELLA.**—Mine report for fortnight ending February 22: 43 feet level north drive, section 14. This drive is now in 179 feet from No. 1 north, making 24 feet driven for the fortnight. Lode 3 feet wide. This leaves about 40 feet to drive to hole No. 2 north shaft.—43 feet level north stope, section 15. Six men in this stope. Reef averaging about 6 feet.—43 feet level south stope, section 21. Two men breaking stone here; reef about 2 feet wide.—Winze No. 2 south level, section 21. This winze was holed through to 100 feet level on the 14th inst., and found that we had sunk on a different shoot of stone to that which the 100 feet level drive south was on. This was caused by the reef having faulted here. Lode about 3 feet 6 inches wide.—South drive 100 feet level, section 21. Have driven 25 feet for fortnight, making total distance of 329 feet from crosscut. We are now driving on to No. 3 south. Lode about 3½ feet thick. We expect to strike better stone here shortly.—North drive 100 feet level, section 15. Have driven 11 feet for fortnight, making 177 feet from crosscut, carrying 4 feet of stone.

**KING SOLOMON'S.**—The engineer reports under date Feb. 26: The work on the mine is progressing satisfactorily. Lease No. 376 south-east drive is now 56 feet, and I expect every day to cut the reef.—No. 82. The shaft is now down to a depth of 105 feet, and being well-timbered is now perfectly safe. The water level will be reached in another 7 or 8 feet, and will then start crosscutting.

**LOMBARDY.**—Manager reports for week ended February 21: Main shaft is down 20 feet in a decomposed felsepathic rock here called kaolin. Several leaders are coming in showing we are near a lode. I have called for tenders to continue sinking.—Water shaft. Work is still going on here, and have likewise called for tenders. Have let contract for firewood and mining timber.

**NO. 7 NORTH-EAST QUEEN.**—The following fortnightly report has been received from the mine, dated Charters Towers: I have the honour to report that on the 6th inst. Wherry and party cleaned up a crushing of 33 tons 10 cwt. for 76 ounces 8 dwts. 6 grains of smelted gold. They have at present an average of about 15 inches of stone in their (face) leading stope for a distance of 20 feet along the face, equal in quality to that last crushed. Their No. 2 stope carries occasional patches of good stone, and has every appearance of making into a fine reef. They have from 4 to 5 tons broken already. On the 8th inst. Balch and party crushed 38 tons for a yield of 54 ounces 10 dwts. 12 grains of smelted gold. Penhallweek and party have an average of 2 feet 6 inches of stone, medium quality, in the drive just now, but the stope for 25 or 30 feet at the back will average from 12 to 15 inches of good quality. Ferguson and party have 2 feet of stone of poor quality on the hanging-wall, with a new make of good stone coming in on the footwall, while the hanging-wall is turning over as if cutting out the white stone. Hamilton and party have their drive in a distance of 76 feet, with no stone in the face, but the formation is not near so hard as it has been. Since the heavy rains the water is very heavy throughout the mine both at surface and bottom. The carpenter is getting on well with the boiler shaft, though it will take him three more days, I think, to finish. Quartz hauled for the fortnight about 17 tons.

**SOUTH ORION.**—The manager reports for the month of February: No. 1 shaft sunk and timbered to a total depth of 61 feet. Fair progress has been made with buildings, engine beds, haulage, &c.

**WESTLEIGH MINES.**—Extract from manager's report for four weeks ending March 4: Progress of mine development during period.—West incline, 28 feet; west vertical No. 1, 2 feet; west vertical No. 2, 2 feet; east incline, 50 feet; east vertical No. 1, 6½ feet; east vertical No. 2, 22 feet; Venture shaft, 5 feet; Trial shaft near No. 2 west, 18 feet; total, 133 feet.

**WOODSTOCK (New Zealand).**—The mine manager's report for February states as follows:—As the result of calling tenders, Messrs Price have secured contract for the erection of the new mill, buildings, battery, cyanide-plant, sumps and furnaces, and they have commenced work. Tenzar Bros. have the contract for the water main, and as both parties are experts in their respective lines, it is a foregone conclusion that the work will be done in first class style.—Maria lode. No. 2 level has been driven 25 feet by contract, and No. 3 level 11 feet. The lode in both is still disturbed and the ore is low grade in consequence. According to survey the faces of both levels are within a few feet of the point where the Hauraki rich ore shoot should be met with, and we might strike it in a few hours or it may take another month. Everything depends on the strike of the rich shoot. The No. 4 level crosscut has been driven 20 feet by contract. Within the next 10 feet we expect to intersect the (Maria) lode upon which the level will then be run southwards. Here I am confident of finding the lode larger and richer than in No. 3, and in my next anticipate the pleasure of verifying my expectations. On No. 5 level they have driven 65 feet. Another 90 feet should bring this up to the lode upon which it will afford about 100 feet of backs, and here too I expect to see it large and rich. There is little change in the stope here, the assay value being still about £4 15s. per ton. The quantity stope out during the past 4 weeks is 280 tons and the estimated quantity remaining in the block opened up between 2 and 3 is 1800 tons. From No. 2 to the surface, about 200 feet, there is a large block of ore about which no estimate can be formed till it is opened up.—Shepherd's lode. Three stopes are now in progress, the lode averaging 18 inches in thickness and the block opened up is over 100 feet in length. During the month 56 tons have been broken out and the value averages £11 per ton. On the Ivanhoe section contractors have completed their driving 100 feet, and fresh tenders have been invited for 50 feet additional. At the mill (10 stamps) during 24 days 224 tons of ore were dealt with, yielding £396, and you will note that there is a decided improvement in our extraction and recovery of bullion.



**MOUNT LYELL.**—Engineer in charge of mine reports week ending February 14: No. 3 tunnel, south drive, 3 feet have been driven for the week, total 344 feet 6 inches; no change.—No. 4 tunnel, south drive, the face has been advanced 8 feet, total 444 feet; driving in pyrites above average grade.—No. 3 crosscut, south drive No. 4 tunnel. The face has been driven 4 feet, which are of good value in gold, silver, copper.—No. 2 crosscut, No. 5 tunnel. Face has been extended 2 feet, total 28 feet; no change.—Progress report for week ending February 14: Hauling line. Terminal cutting on main side completed, bank engine started up to turn off brake race of drum, setting line, and laying centre boards.—Smelter building. Bins all floored and sided, feed floors in progress, putting in partitions and other inside work.—Crusher building. Frame of bin housing completed, laying bin decking, framing trusses over engine room, &c.—Hill flue. Upper terminus against main chimney in progress.—Hot blast stover. Front walls and supporting piers of all fire boxes well forward, also side walls of heating chambers.—Flueboiler and Wilcox boilers. Wall in progress.—Blast furnace. Brick shaft of No. 1 completed, raising iron frames and hoods of both furnaces, bottom plates and caisson plates of No. 2 in position, and brick lining in progress.—Furnace service tank. Work resumed and nearing completion, except caulking.—Converter department. Outside flue in progress to base of vertical dust chamber forming beginning of hill flue, excavation for latter complete up to level of through tram. Weather very fine and dry.—Railway engineer's report for week ending February 16: The whole of the formation is quite complete, ready for the bridges, ballast, and metals as far as the 15 Mile, and from there to the end of Hall's Creek the whole line is in progress. From Hall's Creek to Lynchford the culverts are in progress. At Lynchford work is now in progress on the station site, and the contractors have the earthworks in a very advanced state towards the crossing, and may probably be completed in three weeks.

**GOORUGUM.**—Superintendent's report for fortnight ending March 10: Taylor's shaft sunk 11 feet in depth below the 860 feet level 91 feet. The lode matrix is very contracted, being only a few inches in width, chiefly pyrite and quartzite intermixed with pyrites. The 860 feet level south drive 30 feet, total 166 feet. Lode 1 foot 9 inches wide, assay value 16 dwts. 18 grains. No. 1 winze, 860 feet level south, sunk 5 feet 9 inches, total 12 feet 9 inches. Lode 1 foot wide, assay value 1 ounce 3 dwts. 22 grains. The 860 feet level north drive 16 feet 6 inches, total 71 feet 6 inches. Lode 1 foot wide, assay value 13 dwts. 2 grains. The 760 feet level south drive 7 feet 6 inches, total 533 feet. Lode 1 foot 3 inches wide, assay value 9 dwts. 19 grains. No. 3 winze, 760 feet level south, sunk 5 feet, total 39 feet 6 inches. Lode 1 foot 9 inches wide, assay value 4 ounces 18 dwts. No. 3 rise, 760 feet level south, risen 10 feet, total 36 feet 6 inches. Lode 6 inches wide, assay value 1 ounce 12 dwts. 16 grains. No. 3 winze, 660 feet level south, sunk 4 feet 9 inches, total 54 feet 6 inches. Lode 6 inches wide, assay value 8 dwts. 17 grains. No. 4 winze, 660 feet level south, sunk 2 feet 6 inches, total 13 feet. Lode 1 foot wide, assay value 10 dwts. 21 grains.—Wallroth's shaft. The men are engaged cutting plat for shoot pass below the 1160 feet level, which is progressing satisfactorily. The 1060 feet level south drive 17 feet 9 inches, total 264 feet. The No. 1 winze, 1060 feet level south, sunk 5 feet 3 inches, total 34 feet. The reef continues very small. The crosscut west, 1060 feet level south, driven 10 feet, total distance 98 feet. The 1060 feet level north drive 16 feet 3 inches, total 203 feet. No. 1 winze in this level sunk 4 feet 9 inches, total 37 feet 3 inches. No change to notify at either point. The 960 feet level south drive 24 feet 3 inches, total 739 feet 6 inches. No. 2 winze in this level sunk 4 feet, total 73 feet 6 inches. Lode at each point contracted. No. 3 winze 960 feet level south sunk 3 feet 3 inches, total 25 feet 6 inches. Lode 4 inches wide, assay value 8 dwts. 17 grains. The 960 feet level north drive 14 feet 9 inches, total 146 feet 3 inches. Lode 4 inches wide, assay value 9 dwts. 19 grains. The 760 feet level north resumed. Driven 2 feet 6 inches, total 445 feet. Lode 6 inches wide. No sample taken. No. 1 winze level north from crosscut east, 460 feet level south, sunk 5 feet 9 inches, total 50 feet 6 inches. Lode 1 foot 6 inches wide, assay value 7 dwts. 15 grains. No. 1 rise level north from crosscut east, 460 feet level south, risen 4 feet, total 52 feet. Lode pinched; suspended. Level south from crosscut east resumed. Driven 8 feet, total 65 feet 6 inches. Lode 1 foot 6 inches wide, assay value 6 dwts. 12 grains. The 460 feet level north drive 14 feet, total 298 feet 6 inches. Lode 4 inches wide, assay value 6 dwts. 12 grains. No. 2 winze 460 feet level north commenced. Sunk 8 feet 4 inches. Lode 2 feet wide, assay value 10 dwts. 21 grains. No. 2 winze 360 feet level north resumed. Sunk 1 foot 3 inches, total 46 feet 3 inches. Lode small. Low's shaft sunk 3 feet, total 817 feet 4 inches. Concomitant with the sinking we are still excavating ground for the shoot pass. The 810 feet level from point of intersection driven 30 feet, total 38 feet 6 inches. Lode 3 feet 6 inches wide, assay value 8 dwts. 17 grains. The 810 feet level north from point of intersection commenced. Driven 9 feet 6 inches. Lode 2 feet wide, assay value 5 dwts. 10 grains. The 710 feet level south drive 16 feet, total 301 feet. Lode 3 feet wide, assay value 6 dwts. 12 grains. No. 1 winze 710 feet level south sunk 2 feet 6 inches, total 74 feet. Lode 1 foot 6 inches wide. No sample. No. 2 winze 710 feet level south sunk 5 feet 10 inches, total 19 feet 4 inches. Lode 1 foot 6 inches wide, assay value 4 dwts. 8 grains. No. 1 winze 710 feet level south drive north on lode from point of intersection. Sunk 5 feet, total 52 feet 6 inches. Lode 1 foot 6 inches wide, assay value 7 dwts. 15 grains. No. 1 rise 710 feet level south drive north on lode from point of intersection, risen 3 feet, total 51 feet. Lode 4 inches wide, assay value 9 dwts. 19 grains. Suspended. The 610 feet level south drive 4 feet 3 inches, total 279 feet 9 inches. Lode small. No. 1a winze 610 feet level south sunk 2 feet 6 inches, total 27 feet 6 inches. Lode 1 foot wide, assay value 15 dwts. 6 grains. The 510 feet level south resumed, driven 5 feet 8 inches, total 415 feet. Lode small. Probyn's shaft. The 1150 feet level north drive 12 feet 6 inches, total 52 feet 6 inches. Lode 8 inches wide, assay value 7 dwts. 15 grains. The level east of south 1050 feet level south drive 11 feet, total 140 feet. Lode contracted. No sample. No. 1 winze level east of south 1050 feet level south sunk 5 feet, total 27 feet 6 inches. Lode 3 feet wide, assay value 4 dwts. 8 grains. No. 1 winze 1050 feet level south sunk 2 feet 6 inches, total 105 feet 6 inches. Lode 3 inches wide, assay value 6 dwts. 12 grains. —Stopes for the month of February: Taylor's shaft. Back of 760 feet level south stoped 40½ fathoms. Lode 3 feet wide, assay value 3 ounces 10 dwts. 18 grains. Bottom of 660 feet level south stoped 14 fathoms. Lode 4 feet 3 inches wide, assay value 1 ounce 13 dwts. 4 grains. Bottom of 560 feet level south stoped 37 fathoms. Lode 2 feet wide, assay value 2 ounces 5 dwts. 1 grain. Bottom of 460 feet level south stoped 81½ fathoms. Lode 2 feet 8 inches wide, assay value 1 ounce 7 grains. Bottom of 360 feet level south stoped 9½ fathoms. Lode 1 foot 6 inches wide, assay value 13 dwts. 2 grains. Bottom of level south from back of No. 4 rise 280 feet level south stoped 4½ fathoms. Lode 1 foot 6 inches wide, assay value 3 ounces 9 dwts. 16 grains. Bottom of level north from back of No. 4 rise 280 feet level south stoped 7 fathoms. Lode 2 feet 6 inches wide, assay value 2 ounces 14 dwts. 10 grains. Back of 150 feet level north stoped 6½ fathoms. Lode 3 feet wide, no sample. —Wallroth's shaft. Bottom of 860 feet level south stoped 4 fathoms. Lode 2 feet wide, assay value 6 dwts. 12 grains. Back of 760 feet level south stoped 12½ fathoms. Lode 3 feet wide, assay value 1 ounce 2 dwts. 7 grains. Bottom of 660 feet level south stoped 14½ fathoms. Lode 1 foot 10 inches wide, assay value 11 dwts. 6 grains. Back of 660 feet level south stoped 17½ fathoms. Lode 1 foot 6 inches wide, assay value 15 dwts. 16 grains. Bottom of 660 feet level north stoped 10½ fathoms. Lode 2 feet 6 inches wide, assay value 8 dwts. 16 grains. Bottom of 560 feet level south stoped 22½ fathoms. Lode 3 feet 4 inches wide, assay value 17 dwts. 4 grains. Back of 560 feet level south stoped 34 fathoms. Lode 1 foot 9 inches wide, assay value 1 ounce 16 grains. Bottom of 560 feet level north stoped 13½ fathoms. Lode 2 feet wide, assay value 1 ounce 16 grains. Bottom of 460 feet level south stoped 14½ fathoms. Lode 1 foot 6 inches wide, assay value 18 dwts. 12 grains. Back of 460 feet level south stoped 3 fathoms. Lode 2 feet wide, assay value 8 dwts. 17 grains. Bottom of 460 feet level north stoped 4 fathoms. Lode 2 feet wide, assay value 2 ounces 10 dwts.

2 grains. Back of level south from crosscut east 460 feet level south stoped 6 fathoms. Lode 1 foot 9 inches wide, assay value 7 dwts. 15 grains. Bottom 360 feet level south stoped 25½ fathoms. Lode 2 feet wide, assay value 1 ounce 2 dwts. 7 grains. Bottom of 360 feet level north stoped 6½ fathoms. Lode 1 foot 6 inches wide, assay value 19 dwts. 1 grain. Bottom of 280 feet level south stoped 4½ fathoms. Lode 3 feet wide, assay value 1 ounce 19 dwts. 4 grains. Bottom of 215 feet level north stoped 29½ fathoms. Lode 1 foot 6 inches wide, assay value 13 dwts. 14 grains. Back of 215 feet level north stoped 1½ fathoms. Lode 1 foot wide, assay value 1 ounce 3 dwts. 22 grains.—Low's shaft. 810 feet level cutting plat stoped 3 fathoms. Back of 710 feet level south stoped 2 fathoms. Lode 2 feet wide, assay value 1 ounce 2 dwts. 21 grains. Bottom of 610 feet level south stoped 10½ fathoms. Lode 2 feet wide, assay value 11 dwts. 10 grains. Back of 610 feet level south stoped 1½ fathoms. Lode 8 inches wide, assay value 10 dwts. 21 grains. Bottom of 510 feet level south stoped 1½ fathoms. Lode 1 foot 6 inches wide, assay value 14 dwts. 4 grains. Bottom of intermediate level north back of 200 feet level south stoped 4½ fathoms. Lode 1 foot wide, assay value 10 dwts. 21 grains.—Probyn's shaft. Bottom of 850 feet level south stoped 4½ fathoms. Lode 1 foot 6 inches wide, assay value 7 dwts. 15 grains. Back of 550 feet level south stoped 9½ fathoms. Lode 1 foot 9 inches wide, assay value 1 ounce 16 grains.—Exploratory work, Taylor's shaft. Crosscut west 460 feet level south drive 12 feet 3 inches, total 61 feet; no discovery.—Wallroth's shaft. Crosscut west 1060 feet level north has been commenced, driven 4 feet 3 inches. The crosscut east 760 feet level north drive 1 foot 2 inches, total 3 feet 6 inches. The crosscut west 215 feet level north drive 6 feet 3 inches, total 9 feet 3 inches. The crosscut east 215 feet level north drive 3 feet, total 17 feet 3 inches. No discovery in either of the foregoing crosscuts.—Munday's lode explorations. 280 feet level south drive 2 feet, total 127 feet 9 inches. Lode contains 1 foot of quartz, assay value 7 dwts. 15 grains.—Probyn's shaft. A crosscut has been commenced from end of 950 feet level south drive 18 feet; no discovery. During the month of February we crashed 4973 tons of quartz, which produced 5169 ounces of gold. In addition to this, 4891 tons of tailings were treated, which yielded 1001 ounces of gold, total returns 6170 ounces of gold.

**PUNJOM.**—Report of work done during the month of January:—Mining. The very best attention has been given to all work coming under this head, and I am pleased to say a fair amount of work has been got through. Our prospects continue to look encouraging, notwithstanding the fact that the ore won has been of rather low grade.—August shaft, 200 feet level. There is really no change to report at any of the points being operated on here. The north drive on Gillies' reef is still in very broken ground, and letting out water freely. A crosscut has now been started to go out east to see if the payable ore is in that direction. The course of ore we had passed through and referred to in my last report as being about 5 feet wide has been driven on, and proved not to belong to the main east and west reef. It is simply a floating or intrusive piece of reef, having no defined trend or dip. We have now begun a crosscut north to see if we can pick up the continuation of our east and west reef in that direction. I may remark here that this crosscut is west of the "slide" which cut off this reef as it was followed west. We have succeeded in finding payable ore to the west of this slide in the upper workings, and I see no reason why we should not do so here.—Intermediate level. All points at work here continue to maintain their average output of ore, and I am pleased to say the quality seemed to improve somewhat at the latter end of the month. The western chute of ore on the east and west reef shows fairly well, and I can now see a large reserve of ore for the mill at and above this level.—New leader. Most of the points operated on here are yielding ore for the mill, and from all appearances will do so for many months yet. It is here that we have discovered the payable ore referred to in an earlier part of this report, as being to the west of the slide. As a whole I do not think the mine ever looked more promising than it does to-day.—Driftage. The total driftage for the month is 266 feet 6 inches, and the ore mined 999 tons, made up as follows: August shaft 648 tons, and new leader 351 tons. Of course this does not include many hundreds of feet of stoping.—Milling. This was carried on during 27½ days, crushing 1000 tons, yielding of melted gold 364 ounces 2 dwts.—General. The usual attention has been given to all work coming under this head. Roads into the jungle to reach our timber reserves have been extended, and a gang of men set to work to open the water race preparatory to the erection of a water wheel to assist in driving the mill machinery. The calcining plant is well in hand, and should be completed within the next fortnight. I regret to have to report the breaking out of pleuro-pneumonia among our cattle, causing the death of 16 head, and thereby involving much loss and trouble. You will be able to form some idea of this when I tell you our cartage amounts to about 700 tons per month, and has to be brought in from distances varying from 1 to 3 miles. We have managed to keep the mine and mill going, however, and I now think we shall continue to do so.—Gold stealing. I am pleased to say this has abated, and I am in hopes of stamping it out altogether.—Labour. The supply of this was very short in the early part of the month, but has now become more plentiful.—Health. This is now fairly good again.—Rainfall. The total rainfall for the month is 2½ inches.

**TOLIMA.**—Abstract from report received on March 26: Frias estimated January returns, 120 tons fine silver, valued at 331. per ounce, £4768 12s.; silver valued at, cost £3513 12s.; silver valued at, profit £1255. The underground agent reports 86 fathoms 5 feet 2 inches of ground expended, of which 61 fathoms 3 feet were productive, leaving 25 fathoms 2 feet 2 inches of unproductive ground.—The superintendent, writing under date of February 18, reports an improvement in the grade of ore yielded by the 150 fathom east prospecting winze No. 1, which, after a slight declension in value referred to in his preceding report, was again giving good mineral. He remarks on this circumstance:—"It looks as if we were coming into contact with the branch left on the footwall above, in which case we have good prospects for the 150 fathom level when reached." The superintendent also states that the 150 fathom level footwall side continues in productive ground, with prospects of further improvement; whilst the 140 fathom west end also presented a very promising appearance, and in the 130 fathom level west the lode, as predicted, had opened out, being at the time date 4 feet wide, with an average yield of 15 dwts. per fathom. The 110 and 120 fathom levels north branch are reported still to be in productive ground, and the west crosscut from the 120 fathom level has intersected the lode. The water supply had been well maintained during the month, and all the running machinery worked well.—Underground report: 150 fathom tip plat. We have taken out 15 feet of ground towards the cutting of this plat, and we hope to finish it by the end of the current month, and also bring down the skip road from the 140 to the 150 fathom level. 150 fathom west end hanging wall side was driven 67 feet by two men at \$35 per fathom, and it is without change to note. 150 fathom west end footwall side was driven 15½ feet by two men at \$70 per fathom, thus being 103½ feet as total west of the 150 east winze No. 1. The lode has yielded 10 dwts. of mineral per fathom, and the prospect in forebrest yet holds good. 150 fathom east end was driven 9 feet by two men at \$75 per fathom, thus being 127 feet as total east of the 150 east winze No. 1, and the lode remains poor. 150 fathom east winze No. 1 was sunk 14 feet by eight men at \$180 per fathom, thus being 53 feet as total depth below the 150 fathom level. The first 6 feet yielded 10 dwts. of mineral per fathom, but the remaining portion was in a tight and poor bar of ground, although the present bottom again shows signs of an improvement. 140 fathom west end was driven 11½ feet by two men at \$85 per fathom, thus being 278 feet as total west of the engine shaft, and the lode now yields some good stones of mineral, and the general prospect is favourable for further improvement. 140 fathom east end was driven 21½ feet by four men at \$30 per fathom, thus being 238 feet as total east of the engine shaft. The lode is well defined, but yet poor. 140 fathom east back stop No. 1 was stoped 38½ feet by four men, at \$30 per fathom, and it yielded 3 tons of mineral per fathom. 140 fathom west end from 130 east winze

No. 1 was driven 21½ feet by four men at \$75 per fathom, and the lode is without change to note. 130 fathom west end was driven 11 feet by two men at \$90 per fathom, thus being 650½ feet as total west of the engine shaft. The lode yielded 10 dwts. of mineral per fathom, and although of late it has been yielding irregular patches of mineral, yet in the forebrest there is a very fine lode, whose general aspect should warrant a further improvement. 130 fathom west back stop No. 1 was stoped 23½ feet by two men at \$30 per fathom, and it yielded 1 ton of mineral per fathom. 130 fathom east back stop No. 1 was stoped 10 feet by two men at \$40 per fathom, and it yielded 3 tons of mineral per fathom. 130 fathom east back stop No. 1a was stoped 19½ feet by two men at \$40 per fathom, and it yielded 4 tons of mineral per fathom. 130 fathom east back stop No. 1b was stoped 32 feet by two men at \$35 per fathom, and it yielded 3 tons of mineral per fathom. 130 fathom east back stop No. 2 was stoped 18 feet by two men at \$40 per fathom, and it yielded 10 dwts. of mineral per fathom. 130 fathom east back stop No. 2a was stoped 9 feet on company account, and it yielded 3 tons of mineral per fathom. 120 fathom west end north branch was driven 13½ feet by four men at \$30 per fathom, and it yielded 10 dwts. of mineral per fathom. 120 fathom east end north branch was driven 20½ feet by four men at \$78 per fathom, and it yielded 1½ ton of high grade mineral per fathom. 120 fathom west crosscut to north branch was driven 7½ feet by two men at \$100 per fathom, and it is without change. 120 fathom west back stop No. 3 was stoped 26 feet by two men at \$32 per fathom, and it yielded 1½ ton of mineral per fathom. 120 fathom west back stop No. 3a was stoped 38 feet by four men at \$42 per fathom, and it yielded 3 tons of mineral per fathom. 110 fathom east end was driven 9½ feet by two men at \$70 per fathom, thus being 1012½ feet as total east of the engine shaft, and the lode remains poor. 110 fathom east bottom stop No. 2 was stoped 17½ feet by two men at \$35 per fathom; it yielded 15 dwts. of mineral per fathom. 110 fathom east end north branch was driven 6½ feet by two men at \$90 per fathom, thus being 105 feet as total east of the crosscut, and it yielded 15 dwts. of mineral per fathom. 110 fathom west end north branch was driven 12½ feet by two men at \$65 per fathom, and it is holed to the 110 west main level. 110 fathom west back stop No. 2 was stoped 25½ feet by two men at \$21 per fathom, and it yielded 1½ tons of mineral per fathom. 100 fathom west end was driven 4 feet by two men at \$60 per fathom, thus being 351½ feet as total west of the engine shaft, and the lode is without change. This, for the time being, is suspended, owing to a portion of the level having fallen altogether, or "caved" in. 90 fathom east end was driven 11 feet by two men at \$65 per fathom, thus being 1210½ feet as total east of the engine shaft, and the lode continues strong and well defined, but yet poor. 90 fathom east bottom stop No. 2 was stoped 34 feet by two men at \$18 per fathom, and it yielded 2 tons of mineral per fathom. Shallow adit was driven 9½ feet by four men and a boring machine at \$140 per fathom, thus being 416½ feet as total west of the crosscut, and it is without change.—West-end footwall side. New crosscut was driven 5 feet by two men at \$140 per fathom, and the forebrest lets out more water, and the ground is become easier to work.—Real de Frias. 35 fathom west end was driven 29½ feet by four men at \$55 per fathom, thus being 227½ feet as total west of the shaft, and the lode remains poor. 35 fathom east end was driven 16½ feet by four men and a boring machine at \$110 per fathom, thus being 133 feet as total east of the shaft, and the lode is unchanged.

**VAN RYN GOLD MINES ESTATE.**—Report on operations for month ending January 31: The mines. General manager reports: Mine No. 4. New main shaft sinking 58 feet, old main shaft sinking 22 feet, driving third level 82 feet, driving fourth level 84 feet, driving second level 30½ feet, drives first level on leader No. 1 24 feet, rise to 20 east winze 36 feet. Mine No. 8. Driving first level 61½ feet, driving second level 82 feet, sinking main shaft to third level 16½ feet, rising 2a west winze 85 feet, rising 2a east winze 14½ feet, intermediate drive to east stop 43 feet, intermediate drive 2a east winze 18 feet, total for month, 656½ feet.—Ore developed. Mine No. 4. First level 600 tons, second level 762 tons, third level 2050 tons, fourth level 2100 tons. Mine No. 8. First level 1415 tons, second level 1892 tons, total, 3307 tons. Ore in sight. Mine No. 4. First level 25,700 tons, second level 7272 tons, third level 17,428 tons, fourth level 19,317 tons. Mine No. 8. First level 17,933 tons, second level 25,469½ tons, total, 113,119½ tons. Mine No. 4. Shaft No. 1 was sunk 58 feet, but no timbering done; total depth, 349½ feet. Main shaft No. 4 sunk 22 feet, depth below fourth level 161½ feet, total depth from surface 689½ feet. Fourth level drives were extended east 30½ feet, and west 53½ feet, total 84 feet, total length 1390 feet. The reef in the east drive has been small—i.e. 6 feet, and assaying 6½ dwts.; in the west drive 20 inches, and assaying 26½ dwts. Third level drives were extended 82 feet, total length 1413½ feet, average width of reef 3 inches, assaying 87 dwts. Second level drives east were extended 30½ feet, total length 1408 feet, average width of reef 18 inches, assay 97½ dwts. Immediately on re-starting this drive we struck the reef beyond the dyke, showing remarkably well, both as to size and quality. First level leader drive was extended 24 feet, reef width 2 inches, assay value 1½ dwts. Mine No. 8. Main shaft was sunk 16½ feet; depth below second level 126½ feet, total depth 386½ feet. In consequence of all working being stopped on account of the scare, water got into the shaft, and we were some days before we could resume sinking. First level drives were extended 61½ feet, total length 1496½ feet, width of reef, hanging and footwall, 4 inches. Assay value over stopes width of 40 inches, 29½ dwts. There is a fine stretch of good ground here, which is being opened up for stoping. Second level drives were extended 82 feet, total length 1203½ feet, assay value of east drive over 36 inches stopes, 10 dwts.—Stoping. 3880 tons were milled out of 4369 tons mined.—General. Expenses, both at the mine and cyanide works, are heavier on account of having to pay white men and boys during the disturbances at Johannesburg.—Accounts. 1. Cost of production and costs per ton milled. Mining £3462 13s. 7d., 17s. 10d. per ton, hauling and pumping £3462 13s. 7d., 17s. 10d. per ton, transport £347 14s. 6d., 1s. 9d. per ton, milling £813 7s. 1d., 4s. 2d. per ton, maintenance £362 19s. 1s. 10d. per ton, redemption £578, 3s. 6d. per ton, general charges £340 9s. 9d., 1s. 9d. per ton, total £6006 3s. 11d., £1 10s. 11d. per ton, cyanide works £1806 1s. 7d., 9s. 8d. per ton, total costs £7812 5s. 6d., £2 0s. 7d., realised per ton £2 2s. 6d., profit per ton 1s. 10d.—2. Revenue. Gold at 73s. 3d., value £6325, concentrates at 50s., value £89 0s. 9d., cyanide process 534 ounces, value £1843 15s., total 2338 ounces, £8257 15s. 9d., rents £32, total revenue £22,811 per cent.—3. Profit. Profit for month (p/ates and concentrates) £424 6s. 7d., estimated profit (cyanide work) £64 3s. 3d., total profit for month £488 9s. 10d.—4. Capital expenditure. January. Permanent works £1723 11s. 7d., development £2435 12s., buildings £193 4s. 10d., machinery and plant £14,438 4s. 4d., tools and appliances £170 16s. 6d., surface works £538 12s. 9d., furniture £332 16s. 11d., live stock, &c. £30, total £19,862 18s. 11d.

**LOMBARDY.**—The manager reports for week ended February 15 Lombardy lode. Incline shaft sunk 13 feet, total 33 feet 6 inches.—Main shaft. Have started main shaft, and when sufficient depth is reached will put out drives to intersect Lombardy and other lodes running near it. A fall of rain occurred the other day, washing the dust off our ore heap and disclosing a quantity of visible gold in the stone. Water shaft has been sunk 10 feet, total 17 feet 6 inches.

**WESTERN AUSTRALIAN DEVELOPMENT.**—Fortnightly report received from the mine manager of the McKenzie Gold Mines (Limited):—Glenloth Mine. Main engine shaft sunk an additional 7 feet, total depth from surface 121 feet. Ground much the same as last report. Contractors will complete their contract during the coming week, and I will then proceed to cut a flat or chamber at 120 feet from surface, preparatory to driving south of the lode.—No. 1 shaft. No. 1 stop north advanced to 30 feet from shaft, and timber placed in position. Lode stone of usual quality and size. No. 1 stop south advanced to 25 feet from shaft. Lode 8 to 10 inches wide, estimated yield 3½ ounces gold per ton. I have prepared a working plan and longitudinal section of the mine workings, and will endeavor to get a tracing of same posted to you by the next mail.



## NOTES FROM ANDALUCIA.

## PAPER ON THE CUPREOUS PYRITES DEPOSITS OF ANDALUCIA AND ALGARVE.

## RETROSPECTIVE AND PROSPECTIVE.

Extracts and Notes from Mining Operations and Reports on these during the past 25 years.

By WILLIAM GUTHRIE BOWIE.

(Continued from page 414.)

**N**EXT come the transport of the precipitate, the shipping, export dues, port charges, freights, and charges for stores, brokerage, assays and sales, and allowances to smelters, &c., also losses in transit, which, taken together, including the costs to those using carts and barges, and that of the precipitate, is about 70 per cent. Cu, averages £3 per ton of pure copper realised. Large mines, as stated, have great advantages here also, and more so in the contracts and sales of their precipitate.

Here we have a total of £12 14s. 6d. per ton of pure copper realised as the cementation export expenses up to the sales of the precipitate.

It will be well to remember that a ton of precipitate does not represent a ton of pure copper, but that it may take 1½ or, in cases, 2 or more tons of this to produce a ton of pure copper, according to its average in this; hence the extra cost per ton for export.

If we take the cases where no mining is done, and where simply the mines and abandoned open-cast works are flooded to wash out the sulphates, then the cost will simply be the cementation and export expenses, and if pumping is done, whatever this may be, copper is thus produced in many cases very cheaply, as at Tharsis with its abandoned open-casts full of copper liquors. This is especially the case with the rich liquors from the first floodings, but this richness decreases greatly in every subsequent one.

It has been remarked that these liquors in the open-casts, if left alone and exposed for a lengthened period, show eventually a kind of settling of the substances in the solution either as solids or as dissolved, and hence are found poor in copper where there is great depth, but richer in this nearer the surface. This has been experienced in some flooded works in two or three mines, and especially in one where it was endeavoured to pump the liquors from the deepest levels. The reason of going to expense in shafts and pump works away from the open-cast, and in the solid rock, to thus unnecessarily raise these great bodies of liquors through all such heights, is difficult to understand, but anyhow when the bottom levels were drifted and bored into, the liquors were found so poor in copper, and highly charged with arsenic, iron, and sulphur combinations, as to be utterly useless, and a prejudice to utilise for cementation purposes, and was let run to waste during fruitless endeavours of continued pumping, hoping for improvements. On the other hand, when no time is allowed for these changes by exposure to the air, then the liquors are found fairly homogeneous. This tendency of these liquors to thus concentrate throws new light upon the cause of poorness of copper contents in depth, and towards the extremities in length of these masses, and the richness in this at the surface, and referred to under the geology of Andalusia and Algarve, and is worthy of and is being further studied.

The time it takes to obtain a ton of pure copper from 100 tons of ore is also very variable, as, for instance, see the notes on the produce from calcination obtained by the French company in Tharsis from 540,000 tons of ore, which only gave a return of 1403 tons of copper in seven years, being 0.26 per cent. Cu, thus a mere trifle. While in Rio Tinto there were calcined from 1849 up to 1873 some 1,261,376 tons of the best ore, upwards of 3 per cent. Cu, and yet the Government administration only obtained 20,570 tons of copper, and the present company only obtained 1224 tons from this residue, including what they added in 1873-1874, including the production of copper from the mine liquors, so that during a treatment of 25 years only half the copper content of the ore was obtained, while the whole amount obtained up to date from every source during the past 22 years in this same mine is only equal to 1.564 per cent. Cu, slightly over half the estimated copper content, even if we allow that all the copper produced has been alone from the ore treated and added to that previously existing, but as stated, seeing the abundance of rich liquors from the mines and open-casts, the large quantities of cupreous schist, and other cupreous material treated, and not estimated as ore, also that large quantities of rich ore have been reduced to matte in the cupola furnaces many years in use, and other processes have been used to recover the copper from ores rich in this, all of which have gone to make up this return of 1.564 per cent. Cu, everyone must be convinced of the long time it takes to recover the copper contents from calcined ore that much of this will never be recovered, or that the estimations made of the copper contents are not correct. On the other hand, turning to other mines treating by natural vitriolisation of the ore in its natural state, as, for instance, Santo Domingo, where 2,929,656 tons of ore, which includes 1,313,909 tons previously decopperised, there was obtained between 1881 and 1886, that is in five years, 2.2 per cent. from this total, equal to over 1 ton of copper in two and a half years. And in other mines a quicker return of 1 ton of copper has been obtained, while after all, as has been stated, the present values of the residues for sulphur, iron, &c., are of great importance, which the calcination has in others destroyed.

If then interest is allowed on the outlay of capital until the time this is recovered by the value of copper produced, it will be found that the charges made here are low enough for all practical purposes and calculations, even if included in the same, the cheaper copper realised from flooding the mines and open-casts, &c., for sulphates, which last operation will eventually be the fate of all these mines.

(To be continued.)

**THE INSTITUTE OF SECRETARIES.**—At the general meeting held recently (March 26) the result of the examination held by Mr. T. M. Stevens, M.A., B.C.L., Barrister-at-Law, upon "Company Law," was made known. The first prize of 5 guineas, which was open to both Fellows and Associates, was won by Mr. E. Bergholt (F.), whilst the second prize, open to Associates only, was gained by Mr. A. E. Hanford (A.). The following, in order of merit, were specially commended:—F. B. Crouch, G. O. Parsons, F. J. Asbury, A. F. Harrison, A. J. Monahan, D. B. Gardner; and the following, in alphabetical order, passed to the satisfaction of the examiner:—T. Adams, A. B. Atkinson, J. Y. Barff, S. C. Clements, R. H. Dix, J. H. Drury, E. C. Elderton, C. Eldridge, G. A. Eden, W. D. Goatly, H. W. Harrison, W. G. Hislop, C. D. Jeffries, E. Martin, J. H. McNeill, F. T. Netherclift, S. Platts, E. P. Pollan, A. Rimmer, G. B. E. Ritchie, R. T. Serrano, R. W. Shackleton, W. R. Strong, E. Tate, H. Theobald, W. Willink. The Council will shortly institute examinations for the admission of members, and proposes ultimately to apply for a charter.

## PROVINCIAL SHARE MARKETS.

## THE CORNISH MINE SHARE MARKET.

Messrs. ABBOTT AND WICKETT, Stock and Share Brokers and Mining Share Dealers, Redruth, write under date of April 1:—Very little doing this week, and prices virtually unchanged. Dolcoaths are about 15s. to 15s. 6d. Grenvilles are enquired for at 6½. Quotations herewith:—Blue Hills, 1s. to 2s.; Basset Mines, 1 to 1½; Carn Brea, ½ to ¾; Dolcoath (fully paid), 15s. to 16s.; ditto (5s. paid), 3s. 6d. to 4s. 6d.; East Pool, 2½ to 3; Killfret, 6s. to 7s.; Polberro, ½ to ¾; South Crofty, ½ to ¾; Tincroft, ¾ to 1½; West Kitter, 2½ to 3; Wheal Grenville, 6 to 6½; Wheal Kitty, ½ to ¾; Wheal Metal (3s. paid), 3s. 6d. to 4s. Tin, 60s.

## MANCHESTER.

Messrs. JOSEPH R. and W. P. BAINES, Stock and Share Brokers, Queen's Chambers, 7, Market street, write, April 1 (noon):—All markets irregular this week, the approach of Easter holidays tending to restrict new business, and this influence being reflected on quotations. Home rails contradictory. Great Easterns and Lancashire and Yorkshire better, and Great Northern A and "Berwicks" lower, these being prominent, whilst other changes are of small amount, with slight majority on the upward side. Canadians and Mexican rail issues all lower, save for advance of ¾ in Canadian Pacific. Americans nearly all better, but New York Centrals are an exception, with fall of ½; and Louisville, though considerably above lowest points of the week, are still ½ below last Thursday's close. Daily movements as follow:—On Friday last idleness was the prevailing feature, with little or no changes in quotations for home rails. Canadians all round, and Mexican rails generally easier. Americans began lower, and did not mend during the day. Saturday produced but little business, and as a rule figures tended easier. On Monday there was an improved tone in the market. Americans particularly strengthened, and home rails put on a few gains in values. Canadians did not come in for any change worth naming, and Mexican rails were weak. Yesterday home rails went a little lower as a rule, but the exceptions are found in Great Easterns, Leeds, Chatham and Dover A, all of which show slightly improved prices, the first named most particularly. No change in Grand Trunk issues or in Canadian Pacifics. Mexican rails lower all round. Americans began steady, and improved with best points ruling at the finish. This morning home rails began fully up to last night's close. Americans, whilst some irregular changes came from New York, opened better for the more active stocks, and Canadians easier. Consols 3-16 better on the week. In Colonials, the only alteration is a rise of 1 to 2 in Canada Registered. Home Corporation stocks still in demand, and the only changes marked (though few) are to higher figures. Foreigners lower generally, but Uruguay Three and a Half per Cent. are ½ up. Record for further departments explains itself by the details of changes hereunder.

CONSOLS.—Higher: Two and Three-quarter per Cent., 3-16. COLONIAL STOCKS, &c.—Higher: Canada Registered, 1 to 2. CORPORATION STOCKS AND DEBENTURES.—Higher: Bradford, Three and a Half per Cent., 1; St. Helens Three per Cent., ½; Stockport Three per Cent., 1 to 2.

FOREIGNERS.—Higher: Uruguay Three and a Half per Cent., ½. Lower: Argentine Six per Cent., ¾; Argentine Five per Cent., ¾; Brazilian Four per Cent., 1½; Egyptian Unified, ¾; Italian Rentes, ¾; Mexican Six per Cent., ¾; Spanish Four per Cent., ¾ to ¾.

BANKS.—Higher: Manchester and County, ¾ to ¾; Manchester and Liverpool District, ¾. Lower: Imperial Ottoman, ¾; London and Midland, ¾.

INSURANCE.—Higher: Equitable Fire, 6d. to 1s.; Liverpool, London, and Globe, ¾; Thames and Mersey Marine, 3-16. Lower: Manchester Fire, ¾ to ¾; Palatine, 1-16.

COAL, IRON, &c.—Higher: Parkgate, 3. Lower: Bolekew Vaughan (£20 paid), ½; ditto (£12 paid), 3-16; John Brown, ¾; Sheepbridge A, ¾.

TELEGRAPHS AND TELEPHONES.—Higher: Anglo-American Deferred, ½; ditto Preference, ¾ to ¾.

BREWERS.—Higher: Farnham United, ¾; Parker's, ¾; Springwell, ¾ to ¾; Thelfall's, ¾ to ¾.

MISCELLANEOUS.—Higher: Earles, ¾; Kellner Partington, ¾; Lever Brothers Pref., ¾; Lister and Co., ¾ to ¾; Manchester Carriage A, ¾ to 1; ditto C, ¾; Salt Union, 1-16; United Alkali, 1-16 to 1; Gas Light A, 5 to 8; Imperial Continental Gas, 2 to 3; Liverpool United Gas A, 2 to 5. Lower: Bradbury and Co., 2½; Brunner Mond, ¾; Coats Ordinary, ¾; Eastmans, ¾; Ship Canal Pref., 1-16 to ¾.

LATER (4 P.M.)—In home rails demand continues with consequent further advances in prices. The Grand Trunk monthly statement has put the market for their issues flat. Americans began well, and have maintained the improvement all day. In Mexican nothing doing.

## SCOTCH MINING AND INDUSTRIAL COMPANIES SHARE MARKETS.

**STIRLING.**—Mr. J. GRANT MACLEAN, Stockbroker and Ironbroker (April 1), writes:—Since last report (March 26) the market has not been very active, owing to the unsettled state of foreign politics and the approaching Easter holidays. Trade reports, however, continue favourable.

In shares of coal, iron, and steel companies prices are generally lower. Wilsons and Clyde have declined as no dividend is to be paid this time. Steel Company of Scotland B Debentures offered. Marbella are at 4½, Niddrie 4½, and Stewart and Clydesdale 1½.

In shares of copper concerns prices do not show much alteration. Mason and Barry announces a dividend of 2s. 6d. per share and return of £1 per share on account of capital. Arizona are at 47½. Copiapo 45s., Mount Lyell 6, Tharsis 10s. 6d. Polberro Tin offered at 2s. 6d.

In shares of gold and silver mines there has been less business doing. Chartered shares declined from 93s. 9d. to 79s. 3d., and are now about 83s. The news of the Matabele rising accounts for the fall. Consolidated are also lower at 12½, although a dividend of 50 per cent. has been announced, and the meeting confirmed the agreement with the managing directors for cancelling their claim on future profits. East Rand and Randfontein have not varied very much. Broken Hill have declined from 47s. 6d. to 46s., although the usual monthly dividend of 1s. is announced, payable April 15. African Estates are at 40s.; Anglo French Exploration, 96s. 3d.; Aurora West, 27s. 6d.; Afrikaner, 25s.; Bayley's West, 5s. 9d.; Barnato Bank, 36s. 3d.; Blue Spur, 3s. 6d.; Bonnie Dundee, 5s. 6d.; Big Blow, 14s.; Balaghat, 3s. 3d.; Cripple Creek Gold Fields, 15s.; Charterland, 15s. 6d.; Emma, 2s. 6d.; Eastleigh Deep, 9s. 6d.; Goolconda, 8s. 9d.; Graskop, 6s. 6d.; Gold Fields of Mzambiquie, 21s. 3d.; Gem of Cap, 2s. 9d.; Hauraki, 16s. 6d.; Hit or Miss, 30s.; Hainault, 28s. 9d.; Joe's Reef, 6s. 3d.; Kathleen, 4s. 3d.; Lady Loch, 75s.; Louisa's Vlei, 19s. 3d.; Lisbon, 6s. 9d.; Londonderry Consols, 2s. 9d.; Mashonaland Agency, 60s.; Marchion New Chums, 10s. 3d.; Marchion Gold Fields, 6s. 3d.; Orient, 9s. 6d.; Oceana, 33s. 6d.; Rothery Block, 7s. 6d.; Royal Oak Hauraki, 3s. 3d.; Rhodesia (Limited), 22s.; Sheba, 44s.; St. Augustine, 10s. 3d.; Spes Bona, 30s.; Tamworth, 10s.; United Rhodesia, 10s.; Victoria, 1s. 6d.; Wentworth, 24s.; West Australian Mining, 10s.; West Australian Gold Concessions, 38s. 9d.; and Zambesia Exploring, 52s. 6d.

In shares of miscellaneous companies there is not much alteration to notice. Oil companies are steady, although the price of petroleum is reported lower in New York. Cheshire Alkali Preferred are at 27s. 6d.; Nobel's Dynamite, 15s.

The traffic receipts of the LA GUAYRA HARBOUR CORPORATION (LIMITED) for one week ending March 28 amounted to £2800. Corresponding period last year, £2000. Increase, £800.

## COMPANY FINANCE.

Reports, Balance Sheets, Dividends, &c., of Mining and other Companies.

## KIMBERLEY WATERWORKS (LIMITED).

The report of the directors states that the working account for the year shows a balance of £20,118 19s. 5d. After providing for interest on debentures and debenture stock £6228, and the usual items of depreciation at Kimberley, £625 11s. 9d., the net available profit for the year, taking into account £197 18s. 6d. for interest on investments, and £456 0s. 5d. for profit on sale of stocks, is £13,919 6s. 7d. Out of this sum the directors propose to write off £2514 15s. 6d. from construction, to transfer the sum of £5329 11s. 1d. to the contingency fund, and to pay a dividend of 2½ per cent. for the year, absorbing £7875. The board are glad to be able to announce an increase in the consumption of water for the year under review, as against that for 1894. The improvement is due mainly to a decrease in the rainfall, and the consequent failure of the supply of water other than that available from this company. Compared with the year 1894, the figures show the satisfactory improvement in the sales of 16,963,194 gallons, amounting in net value to £6477 10s. 9d. A highly satisfactory increase took place in the Kimberley and Beaconsfield town consumptions, of together some 2,600,000 gallons. This is partly to be accounted for by the very dry weather throughout the year, and partly by an improvement in the condition of the townships.

## GREAT LAXEY MINING COMPANY.

The report which the directors will present at next Wednesday's meeting shows that £3000 has been transferred from the reserve fund to the credit of the general account, and the adverse balance on this account has been reduced from £3977, which it stood at at the commencement of the half-year, to £903. The revenue of the mine during the half-year was £8066, and the expenditure £5992. The reserve fund now stands at £2627, as against £5570 at the beginning of the half-year.

**ANGLO-MEXICAN MINING COMPANY (LIMITED).** The directors have declared an interim dividend of 1s. per share (5 per cent.), free of income tax, payable on the 15th inst. at the company's bankers, Messrs. Glyn, Mills, Currie, and Co., 67, Lombard-street, London.

## UNION STEAMSHIP COMPANY.

The report of the Union Steamship Company for 1895 states that the accounts show a considerable increase in the receipts without a corresponding increase in expenditure. After making provision for necessary reserves, the directors recommend a dividend of 10s. per share on the fully-paid shares and 5s. per share on the shares with £10 paid, which, added to the interim dividend paid in November, makes a total distribution for the year of 4 per cent. The insurance fund account now stands at £204,033. The directors have re-established the maintenance and reserve account, and the amount at its credit is £20,000. The mail service has been performed regularly and punctually with two exceptions, but in these two cases the casualties were not of a very serious character, and the consequent repairs have been effected without any material call on the company's resources. To meet the requirements of the trade, additions to the fleet are necessary, and the directors have entered into engagements such as will ensure these additions being made in due time and with proper regard to the interests of the shareholders.

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Union (via Canaries)...	April 25	April 25	April 25	April 25
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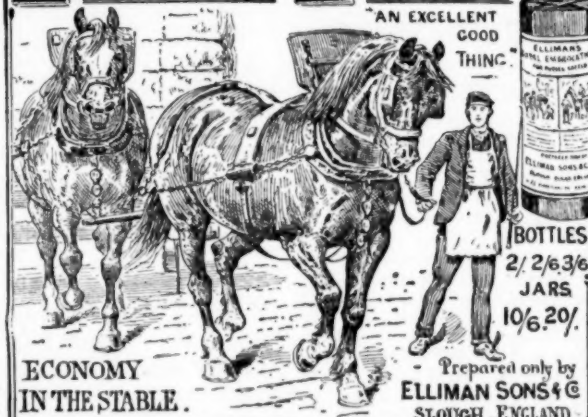
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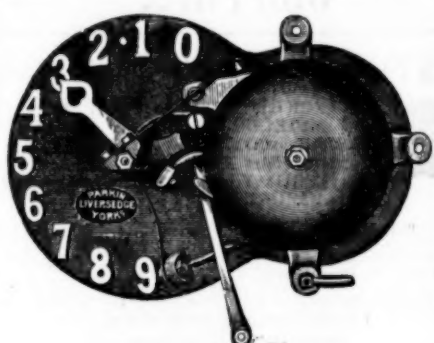
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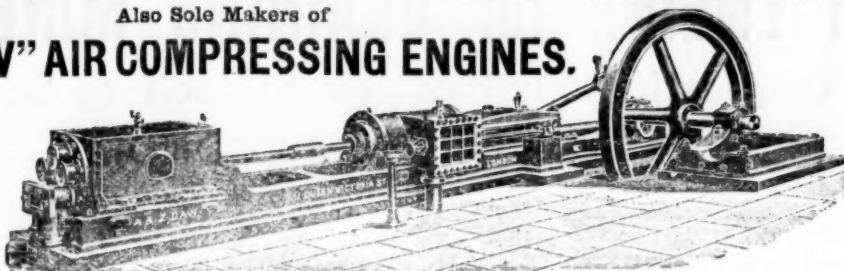
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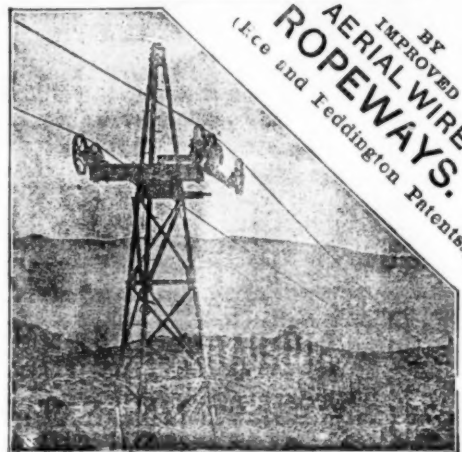
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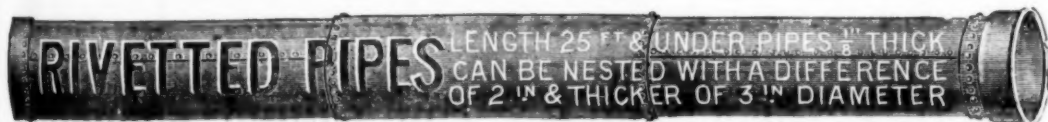
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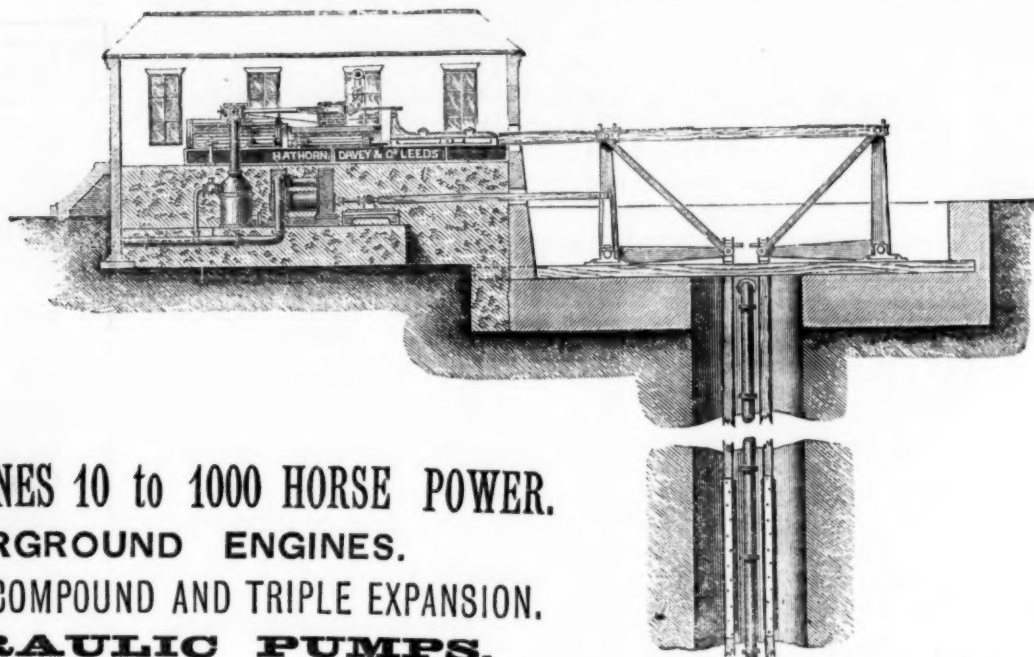


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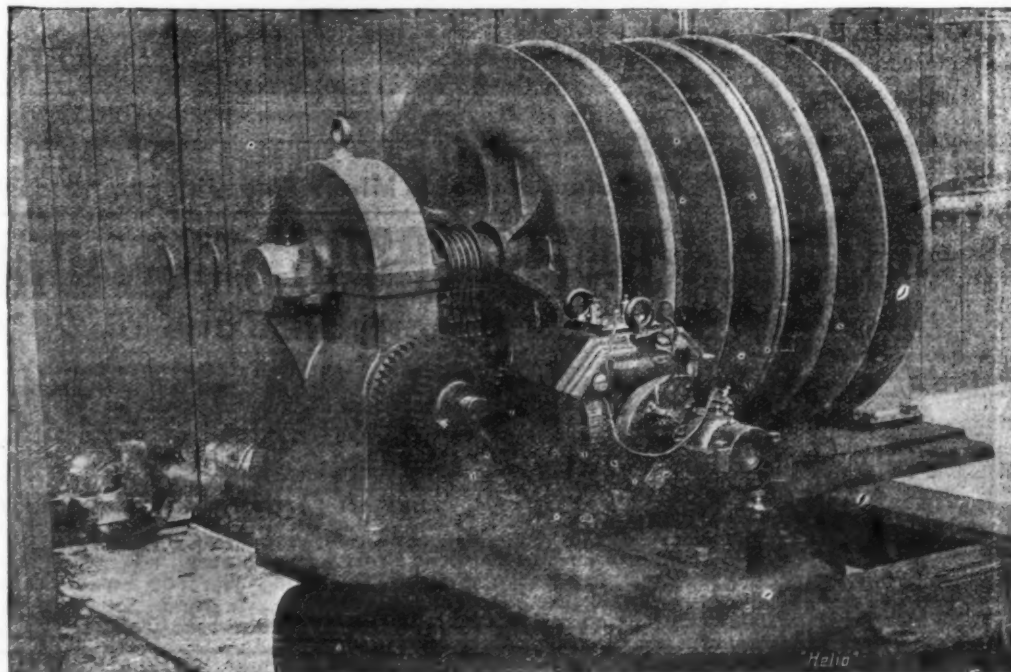
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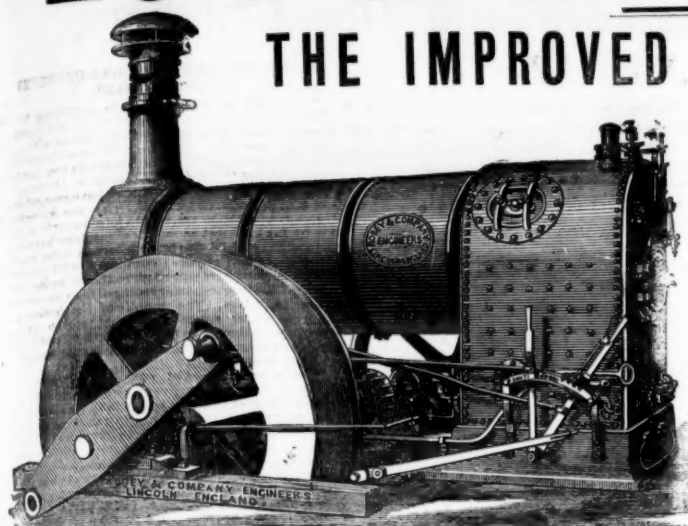
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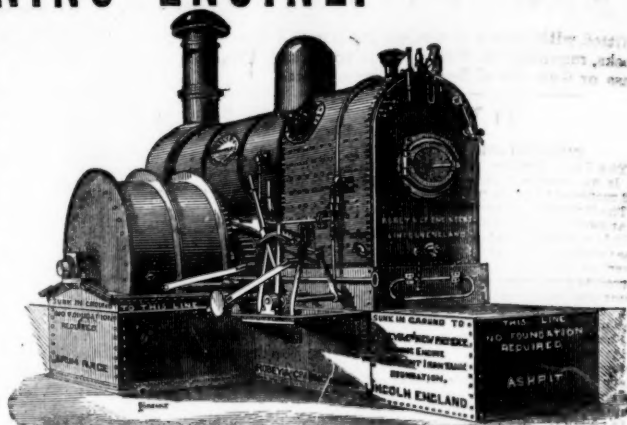
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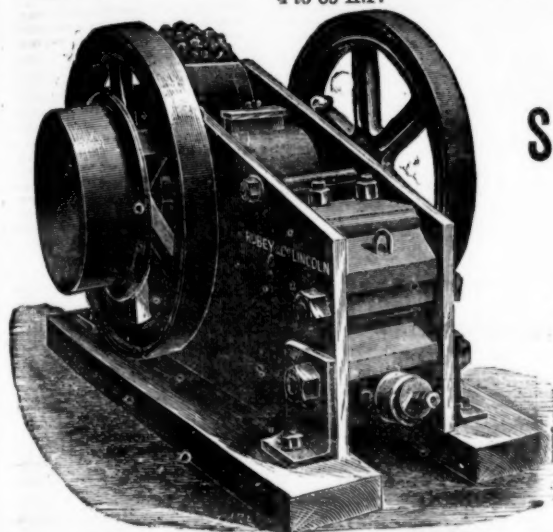


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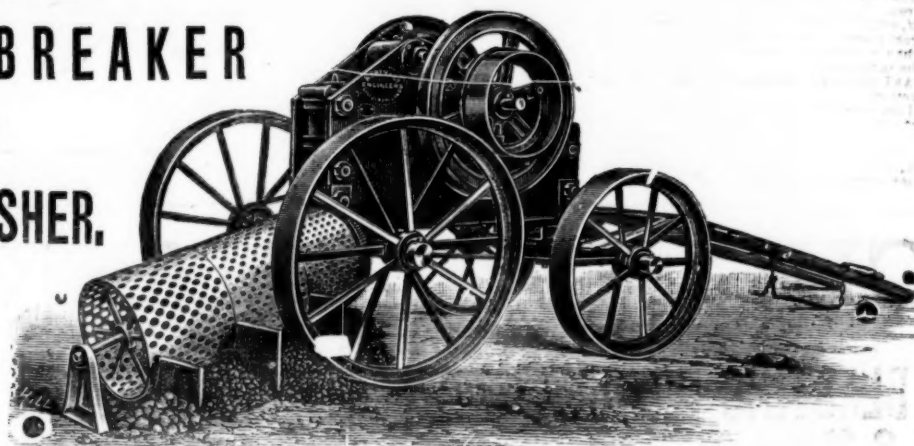
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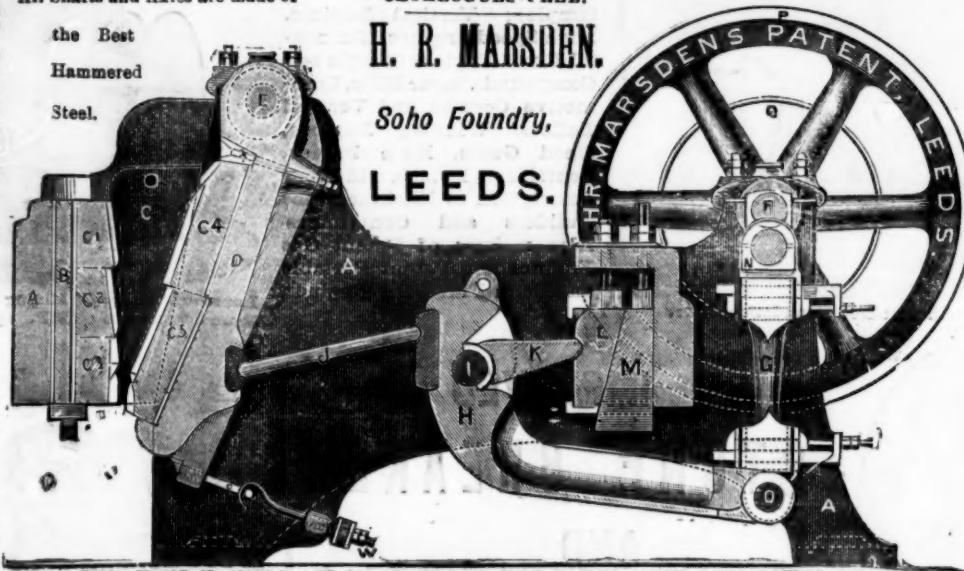
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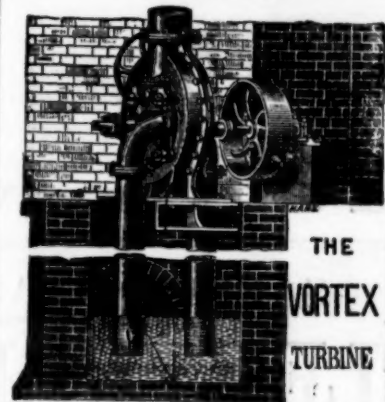
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